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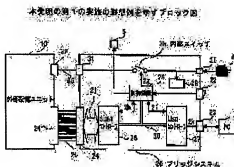
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(54) POWER CONTROL CIRCUIT OF EXTERNAL STORAGE DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a power control circuit of an external storage device which can turn off the electric power after securely writing data to an external storage unit.

SOLUTION: This circuit is equipped with an external storage unit 10 which stores data, a 1st interface which is connected to the external storage unit 10, a 2nd interface for connection with external equipment, a device which performs conversion between the data formats of the 1st and 2nd interfaces, a controller 28 which controls the operation of the whole circuit, an internal switch 35 for supplying the electric power to the external storage unit 10, and an external switch 22 for supplying a power-ON signal; and the controller 28 issues, when it is turned ON, some command to the 1st interface once detecting the external switch 22 being turned on and releases the internal switch 35 when a specific response is sent back from the external storage unit 10, thereby turning off the power source.



Family list**1** family member for: **JP2001350548**

Derived from 1 application

[Back to JP2001350](#)**1 POWER CONTROL CIRCUIT OF EXTERNAL STORAGE DEVICE****Inventor:** SHIMADA MASAKI**Applicant:** KONISHIROKU PHOTO IND**EC:****IPC:** *G06F1/26; G06F1/32; G06F3/06* (+9)**Publication info:** **JP2001350548 A** - 2001-12-21

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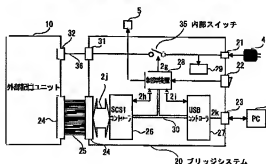
(54) 【発明の名称】 外部記憶装置の電源制御回路

(57) 【要約】

【課題】 本発明は外部記憶装置の電源制御回路に関し、外部記憶ユニットに確実にデータを書き込んでから電源をオフにすることができる外部記憶装置の電源制御回路を提供することを目的としている。

【解決手段】 データを記憶する外部記憶ユニット 1 0 と、該外部記憶ユニット 1 0 と接続される第 1 のインタフェースと、外部機器と接続するための第 2 のインタフェースと、該第 1 のインタフェースと第 2 のインタフェースのデータ形式の変換を行なう装置と、全体の動作を制御する制御装置 2 8 と、前記外部記憶ユニット 1 0 に電源を供給するための内部スイッチ 3 5 と、電源のオンオフ信号を与える外部スイッチ 2 2 とを具備し、前記制御装置 2 8 は電源オンの時、前記外部スイッチ 2 2 が押されたことを検出すると、第 1 のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニット 1 0 から返ってきたら前記内部スイッチ 3 5 を解放して電源をオフにするように構成する。

本発明の第 1 の実施の形態例を示すブロック図



【特許請求の範囲】

【請求項1】 データを記憶する外部記憶ユニットと、該外部記憶ユニットと接続される第1のインタフェースと、

外部機器と接続するための第2のインタフェースと、該第1のインタフェースと第2のインタフェースのデータ形式の変換を行なう装置と、

全体の動作を制御する制御装置と、前記外部記憶ユニットに電源を供給するための内部スイッチと、

電源のオンオフ信号を与える外部スイッチとを具備し、前記制御装置は電源オンの時、前記外部スイッチが押されたことを検出すると、第1のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニットから返ってきたら前記内部スイッチを解放して電源をオフにすることを特徴とする外部記憶装置の電源制御回路。

【請求項2】 前記制御装置は電源オンの時、前記外部スイッチが押されたことを検出すると、前記第2のインタフェースから前記外部記憶ユニットに対するコマンド或いはデータが無いのを一定時間確認し、一定時間無い時には前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニットから返ってきたら前記内部スイッチを解放して電源をオフにすることを特徴とする請求項1記載の外部記憶装置の電源制御回路。

【請求項3】 前記第2のインタフェースから前記外部記憶ユニットに対するコマンドが一定時間無い場合には、前記内部スイッチを解放して電源をオフにすることを特徴とする請求項1乃至2の何れかに記載の外部記憶装置の電源制御回路。

【請求項4】 前記外部記憶ユニットはリムーバブルメディア・ドライブユニットであり、該メディアが外部記憶ユニットに入っていない状態が一定時間経過した時は、前記内部スイッチを解放して電源をオフにすることを特徴とする請求項1乃至3の何れかに記載の外部記憶装置の電源制御回路。

【請求項5】 時刻を計する計時手段を具備し、決まった時間になると電源をオンにしたりオフにしたりすることを特徴とする請求項1乃至4の何れかに記載の外部記憶装置の電源制御回路。

【請求項6】 電源オンの時、前記外部スイッチが押された時に前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが前記外部記憶ユニットから返ってきたら電源をオフにするか、外部スイッチが押されたらすぐに電源をオフにするかの選択を前記第2のインタフェースを介して指示できることを特徴とする請求項1記載の外部記憶装置の電源制御回路。

【請求項7】 電源オンの時、前記外部スイッチが押された時に前記第2のインタフェースから前記外部記憶ユ

ニットに対するコマンドが無いのを一定時間確認し、一定時間無い時には前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニットから返ってきたら電源をオフにするか、外部スイッチが押されたらすぐに電源をオフにするかの選択を第2のインタフェースを介して指示できることを特徴とする請求項2記載の外部記憶装置の電源制御回路。

【請求項8】 前記第2のインタフェースから前記外部記憶ユニットに対する要求が一定時間無い時には、電源をオフにするかどうかの選択を第2のインタフェースを介して指示できることを特徴とする請求項3記載の外部記憶装置の電源制御回路。

【請求項9】 前記外部記憶ユニットはリムーバブルメディア・ドライブユニットであり、該メディアが外部記憶ユニットに入っていない状態が一定時間経過した時は、電源をオフにするかどうかの選択を前記第2のインタフェースを介して指示できることを特徴とする請求項4記載の外部記憶装置の電源制御回路。

【請求項10】 決まった時間の設定を前記第2のインタフェースを介して指示できることを特徴とする請求項5記載の外部記憶装置の電源制御回路。

【請求項11】 電源オンの時、前記外部スイッチが押された時に、前記制御装置は、第2のインタフェースを通じて外部装置に通知し、該外部装置の指示で電源をオフにすることを特徴とする請求項1記載の外部記憶装置の電源制御回路。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は外部記憶装置の電源制御回路に関し、更に詳しくはパーソナルコンピュータ（以下パソコン又はPCと略す）等の外付け記憶装置の電源制御回路に関する。

【0002】

【従来の技術】USB、IEEE1394といったモダンなインタフェースを持つMO（光磁気ディスク装置）、HDD（固定ディスク装置）、CD-R/Wといったパソコンの外部記憶装置が盛んに登場している。図10はパソコンと外部記憶装置を示す図である。図において、1はパソコンであり、USBケーブル3を介して外部記憶装置2と接続されている。

【0003】これらの外部記憶装置の多くは既存のATAPI、SCSIといったインタフェースを持つ外部記憶ユニット（いわゆる内蔵型MOドライブ、HDD、CD-R/W）にブリッジシステムを付加しているものが多い。その理由は、以下の通りである。

① 新規インタフェースを持った外部記憶ユニットの開発、量産には莫大の費用と期間を要する。
② 新規インタフェースのどれが主流となるのか現時点では決められない。

【0005】以上のような理由から、ATAPI、SC

SIをUSB、IEEE1394等に交換するブリッジシステムを開発し、又は購入し、これを外付けする方がメリットが多いためである。

【0006】図11はUSB又はIEEE1394インタフェース付外部記憶装置の外観構成例を示す図である。従来の外部記憶ユニット10にブリッジシステム20を付加することで従来の外部記憶ユニット10を利用可能にしている。ブリッジシステム20は、基板に各種の必要部品を取り付けることにより実現している。ブリッジシステム20において、21は電源ジャック、22は電源スイッチ、23はUSB、IEEE1394等のコネクタ、24はSCSI、ATAPI等のインタフェースであり、ブリッジシステム20と接続されている。このように、ブリッジシステムを設けることで、既存のSCSI、ATAPIインタフェースを利用した記憶ユニットをUSB、IEEE1394対応の記憶装置として利用することができる。

【0007】パソコンの高速化とインタフェースの高速化に伴い、外部記憶ユニットの高速化も望まれる。そこで、MO、HDD、CD-R/Wよりアクセスの速いキャッシュと呼ばれる高速な半導体メモリを積んで転送されるデータを一時ここに貯めることで、外部記憶装置としてのアクセスを見かけ上速くして、パソコンを早く解放することができる。

【0008】図12はUSB又はIEEE1394インタフェース付き外部記憶装置の従来構成例を示すブロック図である。図10と同一のものは、同一の符号を付し示す。外部記憶ユニット10とブリッジシステム20とがケーブル25を介して接続されている。24はケーブル25が接続されるSCSIインタフェースである。

【0009】ブリッジシステム20において、26はSCSIコントローラ（第1インタフェースコントローラ）、27は該SCSIコントローラ26と接続されるUSBコントローラ（第2インタフェースコントローラ）である。28はSCSIコントローラ26とUSBコントローラ27間をデータバス30を介して接続する制御装置である。該制御装置28としては、例えばCPUが用いられる。

【0010】2jは、SCSIコントローラ26とSCSIインタフェース24間を流れる第1インタフェース信号である。1はパソコンで、USBコネクタ23と接続されている。2kはUSBコントローラ27とUSBコネクタ23間に流れる第2インタフェース信号である。

【0011】4は電源、21は該電源4が接続される電源ジャックである。該電源ジャック21から入力される電源は、電源スイッチ22を介してブリッジシステム内部に供給される。29は、ブリッジ用電源である。該電源29からブリッジシステム20を動作させるためのパワーが供給される。電源は、コネクタ31とコネクタ3

2と電源供給ライン36を介して外部記憶ユニット10側にも供給される。

【0012】このように構成された装置において、制御装置28は第1インタフェース用制御信号2h、及び第2インタフェース用制御信号2iとデータバス30を介してUSBインタフェースとSCSIインタフェース間の相互変換を行なう。これにより、パソコン1からのデータは、USBコントローラ27からブリッジシステム20に入り、SCSIインタフェース用データに変換され、外部記憶ユニット10に書き込まれる。つまり、従来のSCSIインタフェースを用いた外部記憶ユニット10にUSBインタフェースを使用してデータを読み書きすることが可能になる。

【0013】

【発明が解決しようとする課題】USB、IEEE1394は、ホットプラグ機能（使用しない時には電源をオフにしておくことができる機能）があり、機器を使用しない時にはいつでも電源を切ることができる。ところが、前記キャッシュを持った外部記憶ユニットは、パソコン1から大きなファイルをコピーした時、全てのファイル転送がキャッシュに貯まった分を含めて完了すると、パソコン1にコピー完了を通知する。

【0014】パソコン1は、画面上にダイアログ等を表示又は非表示等してユーザにコピーが終了したことを知らせる。しかしながら、実際にはキャッシュにストックされただけで実際には書き込み作業が完了していないこともあり、この時に電源をオフにされるとキャッシュに貯まった書き残しデータが消えてしまう。

【0015】このような事故を防ぐために特開平8-95715号公報記載の技術がある。しかしながら、この発明では外部記憶ユニット10にもビジー告知手段が必要とする。そのため、前記既存の外部記憶ユニット10にブリッジシステムを付けた外部記憶ユニットには適用できないという問題がある。

【0016】本発明はこのような課題に鑑みてなされたものであって、既存の外部記憶ユニットに確実にデータを書き込んでから電源をオフにすることができる外部記憶装置の電源制御回路を提供することを目的としている。

【0017】

【課題を解決するための手段】（1）請求項1記載の発明は、データを記憶する外部記憶ユニットと、該外部記憶ユニットと接続される第1のインタフェースと、外部機器と接続するための第2のインタフェースと、該第1のインタフェースと第2のインタフェースとのデータ形式の変換を行なう装置と、全体の動作を制御する制御装置と、前記外部記憶ユニットに電源を供給するための内部スイッチと、電源のオンオフ信号を与える外部スイッチとを具備し、前記制御装置は電源オンの時、前記外部スイッチが押されたことを検出すると、第1のインタフェ

ースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニットから返ってきたら前記内部スイッチを解放して電源をオフにすることを特徴とする。

【0018】このように構成すれば、外部記憶ユニットに全てのデータが書き込まれた時に、外部記憶ユニットから返ってくる特定のレスポンスを受けると、電源をオフにするので、外部記憶ユニットに確実にデータを書き込んでから電源をオフにすることができる。

【0019】(2) 請求項2記載の発明は、前記制御装置は電源オンの時、前記外部スイッチが押されたことを検出すると、前記第2のインタフェースから前記外部記憶ユニットに対するコマンド或いはデータが無いのを一定時間確認し、一定時間無い時には前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニットから返ってきたら前記内部スイッチを解放して電源をオフにすることを特徴とする。

【0020】このように構成すれば、第2のインタフェースから前記外部記憶ユニットに対するコマンドが一定時間無い場合に、外部記憶ユニットに全てのデータが書き込まれた時に、外部ユニットから返ってくる特定のレスポンスを受けると、電源をオフにするので、外部記憶ユニットにパソコンが送る全てのデータを確実に書き込んでから電源をオフにすることができる。

【0021】(3) 請求項3記載の発明は、前記第2のインタフェースから前記外部記憶ユニットに対するコマンドが一定時間無い場合には、前記内部スイッチを解放して電源をオフにすることを特徴とする。

【0022】このように構成すれば、第2のインタフェースから外部記憶ユニットに対する要求が一定時間無い場合には、電源をオフにして、外部記憶ユニットの無駄な電力消費を抑えることができる。

【0023】(4) 請求項4記載の発明は、前記外部記憶ユニットはリムーバブルメディア・ドライブユニットであり、該メディアが外部記憶ユニットに入っていない状態が一定時間経過した時は、前記内部スイッチを解放して電源をオフにすることを特徴とする。

【0024】このように構成すれば、リムーバブルメディアが外部記憶ユニットに入っていない状態が一定時間続く時には電源をオフにすることにより、外部記憶ユニットの無駄な電力消費を抑えることができる。

【0025】(5) 請求項5記載の発明は、時刻を計る計時手段を具備し、決まった時間になると電源をオンにしたりオフにしたりすることを特徴とする。このように構成すれば、パソコンのバックアッププログラムと連携し、自動バックアップを行なうことができる。

【0026】(6) 請求項6記載の発明は、電源オンの時、前記外部スイッチが押された時に前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが前記外部記憶ユニットから返ってきたら電源をオフにするか、外部スイッチが押されたらすぐに電源をオフにする

かの選択を前記第2のインタフェースを介して指示できることを特徴とする。

【0027】このように構成すれば、外部記憶ユニットから特定のレスポンスが返ってきてから電源をオフにするか、或いは外部スイッチが押されたらすぐに電源をオフにするかの選択をパソコンから設定することができ、必要に応じた電源のオフ制御を行なうことができる。

【0028】(7) 請求項7記載の発明は、電源オンの時、前記外部スイッチが押された時に前記第2のインタフェースから前記外部記憶ユニットに対するコマンドが無いのを一定時間確認し、一定時間無い時には前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニットから返ってきたら電源をオフにするか、外部スイッチが押されたらすぐに電源をオフにするかの選択を第2のインタフェースを介して指示できることを特徴とする。

【0029】このように構成すれば、外部記憶ユニットに一定時間コマンドが無い場合に、外部記憶ユニットから特定のレスポンスが返ってきてから電源をオフにするか、或いは外部スイッチが押されたらすぐに電源をオフにするかの選択や時間設定をパソコンから行うことができ、必要に応じた電源のオフ制御を行なうことができる。

【0030】(8) 請求項8記載の発明は、前記第2のインタフェースから前記外部記憶ユニットに対する要求が一定時間無い時には、電源をオフにするかどうかの選択を第2のインタフェースを介して指示できることを特徴とする。

【0031】このように構成すれば、外部記憶ユニットに対する要求が一定時間無い時に、電源をオフにするかどうかの選択や時間設定をパソコンからできるので、必要に応じた電源のオフ制御を行なうことができる。

【0032】(9) 請求項9記載の発明は、前記外部記憶ユニットはリムーバブルメディア・ドライブユニットであり、該メディアが外部記憶ユニットに入っていない状態が一定時間経過した時は、電源をオフにするかどうかの選択を前記第2のインタフェースを介して指示できることを特徴とする。

【0033】このように構成すれば、リムーバブルメディアが外部記憶ユニットに入っていない状態が一定時間経過した時に、電源をオフにするかどうかの選択や時間設定をパソコンからできるので、必要に応じた電源のオフ制御を行なうことができる。

【0034】(10) 請求項10記載の発明は、決まった時間の設定を前記第2のインタフェースを介して指示できることを特徴とする。このように構成すれば、決まった時間の設定をパソコンから指示でき、必要に応じた電源のオンオフ制御を行なうことができる。

【0035】(11) 請求項11記載の発明は、電源オンの時、前記外部スイッチが押された時に、前記制御装

置は、第2のインタフェースを通じて外部装置に通知し、該外部装置の指示で電源をオフにすることを特徴とする。

【0036】このように構成すれば、外部装置から電源のオフ制御を行なうことができる。

【0037】

【発明の実施の形態】以下、図面を参照して本発明の実施の形態例を詳細に説明する。図1は本発明の一実施の形態例を示すブロック図である。図12と同一のものは、同一の符号を付して示す。図に示す実施の形態例は、図12の構成図に、内部スイッチ35が加わった点と外部スイッチ22が電流をオンオフするものから第4図に示すものに変った点が異なり、その他の構成要素は図11と同じである。外部記憶ユニット（例えばMOドライブ）10とブリッジシステム20とはSCSIケーブル25と電源供給ライン36とで接続されている。

【0038】電源4からの電源は電源ジャック21を介してブリッジシステム20に入っている。ブリッジシステム20に入った電源は、ブリッジ用電源29によりブリッジシステム20の動作用の電源が作成される。一方、電源ジャック21から入った電源は、内部スイッチ35を介して電源供給ライン36を介して外部記憶ユニット10に入っている。

【0039】パソコン1はコネクタ23を介してUSBコントローラ27と接続されている。該USBコントローラ27は、データバス30を介してSCSIコントローラ26と接続されている。制御装置28は、データバス30を介してSCSIコントローラ26及びUSBコントローラ27と接続されている。また、制御装置28からは、内部スイッチ35にオンオフ制御信号25が出力される。

【0040】電源スイッチ（外部スイッチ）22は、図4に示すように、制御装置28へローアクチブの信号を与える。即ち、外部スイッチ22が押された時に、“L”レベルの信号が制御装置28に与えられる。5は、制御装置（以下CPUという）28から制御されるLEDである。該LED5は、電源オンオフを表示するものである。

【0041】パソコン1からUSBケーブルを通じて送られるコマンドやデータ等は、USBコントローラ27でUSBプロトコルからCPU28で処理できる形に変換される。これをCPU28がSCSIコントローラ26が扱える形式に変換して送る。SCSIコントローラ26はSCSIプロトコルに変換し、外部記憶ユニット10に送る。外部記憶ユニット10からのパソコン1へのコマンドやデータの転送はその逆をたどる。このように、請求項1で述べられた変換装置とは、ここでは、USBコントローラ27、SCSIコントローラ26及びCPU28を示す。このように構成された装置の動作を図2のフローチャートを参照しつつ説明すれば、以下の

通りである。

【0042】図2は本発明の第1の動作例を示すフローチャートである。ブリッジシステム20に電源4が接続されると（S11）、ブリッジ用電源29から電源が供給されCPU28が動作を開始する。CPU28はブリッジシステム20を初期化する（S12）。その後、CPU28は外部スイッチ22が押されるのを待つ（S13）。

【0043】外部スイッチ22が押されると、CPU28は内部スイッチ35をオンにして外部記憶ユニット10に電源を供給し（S14）、LED5を点灯する（S15）。このLED5が点灯することで、電源が入ったことを認識することができる。

【0044】その後、CPU28は、USBコントローラ27とSCSIコントローラ26を使用してブリッジ動作を行ない、パソコン1と外部記憶ユニット10とをうまく通信させる（S16）。内部スイッチ35がオンの時、外部スイッチ22が押されると（S17）、CPU28は電源オフのための後処理に入る（S18）。

【0045】後処理では、CPU28はLED5を点滅させて後処理に入ったことをオペレータに知らせる（S21）。その後、パソコン1からデータコピー依頼があるかどうか一定時間チェックする（S22）。パソコン1から送られるデータは、小さなブロックに分割されて送られる。従って、ステップS22でパソコン1の全てのデータの送りが終わったかどうかをチェックする必要がある。

【0046】パソコン1から再度データ転送依頼があった場合には、ステップS16に戻り、ブリッジ動作を行なう。データ転送依頼がない場合には、CPU28はソフトタイマを用いて例えば1秒たったかどうかチェックする（S23）。データ転送依頼が1秒以上ない場合には、CPU28は次に特定のコマンドコマンドをSCSIコントローラ26を介して外部記憶ユニット10に発行する（S24）。

【0047】その理由としては、外部記憶ユニット10にキャッシュがある場合、不揮発性メモリ（実例としてD、MO、CDそのもの）に書き込み処理が終了していても外部記憶ユニット10は、ブリッジシステム20に対してSCSIコントローラ26を介して処理が終了したことを告げるからである。

【0048】この処理終了通知を受けたCPU28は、外部記憶ユニット10内のキャッシュ（図示せず）に書き込むべきデータが全て揃ったことを認識し、次に確実に記憶媒体への書き込みが終了したことを検知する必要がある。そのため、例えば、CPU28は、第1インタフェースがSCSIの時は、スピンドルダウン（Spindown）コマンドを発行する（S24）。ここで、スピンドルダウンコマンドとは、例えばMOの回転を止めるための信号である。外部記憶ユニット10内のCPU（図示

せず)はスピンダウンコマンドを受けて記憶媒体へのデータ書き込みが終了すると、ブリッジシステム20に対してGOODコンデションを返す。ここで、コマンドはスピンダウンだけに限定されない。リムーバブルメディア・ドライブユニットならば、イジェクトでもよい。但し、最後にメディアが引出される。

【0049】CPU28は、外部記憶ユニット10からGOODコンデションが返ってきたら(S25)、LED5をオフにし(S26)、内部スイッチ35をオフにする(S27)。この状態で、外部記憶ユニット10への電源供給は絶たれる。次に、ステップS13に戻り、外部スイッチ22が押されるのを待つ。

【0050】この実施の形態例によれば、外部記憶ユニット10に全てのデータが書き込まれた時に、外部記憶ユニット10から返ってくる特定のレスポンス(ここではGOODコンデション)を受けると、電源をオフにするので、外部記憶ユニット10にパソコン1が送る全てのデータを確実に書き込んでから電源をオフにすることができる。

【0051】図3は本発明の第2の実施の形態例を示すブロック図である。図1と同一のものは、同一の符号を付して示す。この実施の形態例は、外部記憶ユニット10としてATAPIインタフェースを用いた場合の回路を示す。この場合、図1に示すような第1インタフェースコントローラは不要となる。インタフェースコントローラ27は、インタフェース部33を介してコネクタ23と接続され、パソコン1と接続されている。

【0052】ここでは、インタフェースコントローラ27として、IEEE1394用のものを用いている。IEEE1394用通信線は、内部に電源用線を含むので、若し、パソコン1から電源を供給できる場合、その電源線もコネクタ23と接続される。この場合、電源は逆流防止用のダイオードD2を介して電源ラインに接続される。一方、電源4からの電源も電源ジャック21を介して逆流防止用ダイオードD1を介して電源ラインに接続されている。この結果、ブリッジシステム20を動作させるための電源をパソコン1側と電源4側から供給することができ、逆流防止用ダイオードD1、D2を介して電源の並列運転が可能となる。

【0053】制御装置(CPU)28は、データバス30を介してインタフェースコントローラ27及びATAPIインタフェース24と接続されている。このように構成されたシステムにおいて、外部スイッチ22からのオン信号により、ブリッジ用電源29が供給されている場合について考える。パソコン1から外部記憶ユニット10へのデータ書き込み要求が発生した場合、パソコン1からのIEEE1394に準拠したデータは、インタフェース部33を介してインタフェースコントローラ27に入り、CPU28の間でインタフェース制御信号のやりとりを行ない、IEEE1394準拠のデータ

をATAPIのデータに変換することができる。ATAPI形式に変換されたデータは、一旦外部記憶ユニット10のキャッシュに格納され、その後記憶媒体に書き込まれる。

【0054】ここで、キャッシュに全データが記憶されると、外部記憶ユニット10からブリッジシステム20に対して、処理終了信号が出力される。この処理終了信号を受けたCPU28は、外部記憶ユニット10に対して、特定のコマンド(例えばSpin down)を発行する。このコマンドを受けた外部記憶ユニット10では、記憶媒体へのデータ書き込みが完了した時、内部CPUからデータ書き込み完了(GOODコンデション)信号が出力される。CPU28は、このGOODコンデション信号を受けると、内部スイッチ35を制御し、接点を解放する。これにより、外部記憶ユニット10に供給されていた電源は断になる。

【0055】この実施の形態例の場合も、外部記憶ユニット10に全てのデータが書き込まれた時に、外部記憶ユニット10から返ってくる特定のレスポンス(ここではGOODコンデション)を受けると、電源をオフにするので、外部記憶ユニット10にパソコン1が送る全てのデータを確実に書き込んでから電源をオフにすることができる。

【0056】上述した実施の形態例によれば、上記電源制御が既存の外部記憶ユニットやパソコンのソフトに変更を必要とせずに行なえるという効果がある。図5は本発明の第3の実施の形態例を示すブロック図である。図1と同一のものは、同一の符号を付して示す。図において、37はブリッジシステム20内に設けられたタイマであり、CPU28と接続されている。該タイマ37は、時刻を計時し、バッテリーでバックアップされている。従って、回路の電源が断になっても、タイマ37は時刻を刻み続ける。その他の構成は、図1の構成と全く同一である。このように構成されたシステムを用いて本発明の動作を説明する。

【0057】図6は本発明の第2の動作例を示すフローチャートである。ブリッジシステム20に電源4がつながれると(S11)、ブリッジ用電源29から電源が供給され、CPU28が動作を開始する。CPU28は、ブリッジシステム20を初期化する(S12)。その後、CPU28は、外部スイッチ22が押されるのを待つ(S13)。

【0058】外部スイッチ22が押されると、CPU28は内部スイッチ35をオンして外部記憶ユニット10に電源を供給し(S14)、LED5を点灯する(S15)。その後、CPU28はSCSIコントローラ26とUSBコントローラ27を使用してブリッジ動作を行ない、パソコン1と外部記憶ユニット10とをうまく通信させる(S16)。

【0059】次に、ブリッジ動作が終了すると、CPU

28はタイマ37の時刻を読みに行く。一方、CPU28は外部スイッチ22が押されたかどうかをチェックする(S17a)。外部スイッチ22が押された場合には後処理に入る(S18)。外部スイッチ22が押されない場合、CPU28はタイマ37を用いてパソコン1からのアクセス無しの時間をカウントする(S17b)。つまり、最後にアクセスがあった時の時刻を読み込んでおき、その後の経過時間をカウントすることになる。若し、パソコン1からのアクセスがあった場合には、CPU28は読み込んだ時刻情報を無視する。

【0060】パソコン1からのアクセスがあった場合には、ステップ16に戻りブリッジ動作を行なう。パソコン1からのアクセスがない状態が15分経過した場合、CPU28は後処理に入る(S18)。後処理は、図2に示した後処理と全く同じ処理である。図の④、⑤からの接続も、図2の後処理のシーケンスと対応している。

【0061】この実施の形態例によれば、第2のインタフェースから外部記憶ユニットに対する要求が一定時間無効な場合には、電源をオフにして外部記憶ユニットの無駄な電力消費を抑えることができる。

【0062】図7は本発明の第3の動作例を示すフローチャートである。システム構成としては、図5を用いる。ブリッジシステム20に電源4がつながれると(S11)、ブリッジ用電源29から電源が供給され、CPU28が動作を開始する。CPU28は、ブリッジシステム20を初期化する(S12)。その後、CPU28は、外部スイッチ22が押されるのを待つ(S13)。

【0063】外部スイッチ22が押されると、CPU28は内部スイッチ35をオンして外部記憶ユニット10に電源を供給し(S14)、LED5を点灯する(S15)。その後、CPU28はSCSコントローラ26とUSBコントローラ27を使用してブリッジ動作を行ない、パソコン1と外部記憶ユニット10とをうまく通信させる(S16)。

【0064】次に、ブリッジ動作が終了すると、CPU28は外部スイッチ22が押されたかどうかをチェックする(S17a)。この場合において、CPU28はパソコン1から最後のアクセスがあった時刻を記憶しておく。外部スイッチ22が押された場合には、後処理に入る(S18)。外部スイッチ22が押されない場合には、パソコン1からのアクセス無しが15分経ったかどうかチェックする(S17b)。この15分の時間の経過は、CPU28がタイマ37の時刻情報を読みに行き、前記パソコン1から最後のアクセスがあった時刻を差し引くことによりカウントされる。

【0065】パソコン1からのアクセス無しが15分経った場合には、後処理に入る(S18)。パソコン1からのアクセス無しが15分経たない場合には、CPU28はリムーバブルメディア(以下メディアと略す)無しが5分経ったかどうかチェックする(S17c)。この

場合において、CPU28はメディアが挿入されていたタイマ37を読みに行かない。そして、メディアが引き抜かれたらCPU28はタイマ37を読みに行き、その時の時刻を記憶しておく。そして、メディア無しが5分経過したら、後処理に入る(S18)。後処理のシーケンスは、図2に示したものと全く同一である。図の④、⑤からの接続も、図2の後処理のシーケンスと対応している。

【0066】この実施の形態例によれば、リムーバブルメディアが外部記憶ユニット10に入っていない状態が一定時間以上続く時には電源をオフにすることにより、外部記憶ユニット10の無駄な電力消費を抑えることができる。

【0067】図8は本発明の第4の動作例を示すフローチャートである。システム構成としては、図5を用いる。ブリッジシステム20に電源4がつながれると(S11)、ブリッジ用電源29から電源が供給され、CPU28が動作を開始する。この場合において、CPU28には予約時間が予め記憶されているものとする。CPU28は、ブリッジシステム20を初期化する(S12)。その後、CPU28は、外部スイッチ22が押されるのを待つ(S13a)。外部スイッチ22が押された場合には、ステップ14以降の処理に進む。

【0068】外部スイッチ22が押されない場合には、外部スイッチ22が押されるのを待つ。この間に、タイマ37を読みに行き、タイマ37の時刻が予約時間になったら、CPU28はそのことを検出して内部スイッチ35をオンにする(S13)。この結果、外部記憶ユニット10に電源が供給されるようになる。同時に、LED5を点灯する(S15)。その後、CPU28はSCSコントローラ26とUSBコントローラ27を使用してブリッジ動作を行ない、パソコン1と外部記憶ユニット10とをうまく通信させる(S16)。

【0069】次に、ブリッジ動作が終了すると、CPU28は外部スイッチ22が押されたかどうかをチェックする(S17a)。この場合において、CPU28はパソコン1から最後のアクセスがあった時刻を記憶しておく。外部スイッチ22が押された場合には、後処理に入る(S18)。外部スイッチ22が押されない場合には、パソコン1からのアクセス無しが15分経ったかどうかチェックする(S17b)。この15分の時間の経過は、CPU28がタイマ37の時刻情報を読みに行き、前記パソコン1から最後のアクセスがあった時刻を差し引くことによりカウントされる。

【0070】パソコン1からのアクセス無しが15分経った場合には、後処理に入る(S18)。パソコン1からのアクセス無しが15分経たない場合には、CPU28はリムーバブルメディア(以下メディアと略す)無しが5分経ったかどうかチェックする(S17c)。この場合において、CPU28はメディアが挿入されていた

らタイマ37を読みに行かない。そして、メディアが引き抜かれたらCPU28はタイマ37を読みに行き、その時の時刻を記憶しておく。そして、メディア無しが5分経過したら、後処理に入る(S18)。後処理のシーケンスは、図2に示したものと全く同一である。図の①、②からの接続も、図2の後処理のシーケンスと対応している。

【0071】この実施の形態例によれば、パソコン1のバックアッププログラムと連携し、自動バックアップを行なうことができる。図9は本発明の第5の動作例を示すフローチャートである。この実施の形態例では、外部記憶装置の電源のオフ制御を外部装置(例えばパソコン)から行なうことができるようにしたものである。図9は、後処理を示しており、後処理までは既述したものと同様である。今までの発明では、制御装置(CPU)28がスピンダウンのコマンドを発行していたが、この発明ではスピンダウンのコマンドを外部装置(例えばパソコン)側から発行するようにしたものである。また、電源オフの許可もパソコン側が指示する。システム構成としては、図1を用いる。

【0072】後処理に入ると(S20)、LED5を点滅させて後処理に入ったことを知らせる(S21)。外部スイッチ22が押されると、CPU28は第2のインタフェース(USBインタフェース)を通してパソコン1にスイッチが押されたことを通知する(S23)。

【0073】CPU28は、パソコン1から電源オフの指示があるまでブリッジ動作を続ける(S24、S25)。パソコン1は、全てのデータを排出し終わったら、スピンダウンコマンドを外部記憶装置に発行する。外部記憶装置からGOODコンディションが返ってくれば、全てのデータが不揮発メモリに書き込まれたことを認識し、外部記憶装置のCPU28に対して電源オフの指示を行なう(S24、S25)。CPU28は、パソコン1からの指示を受けてLED5をオフにし(S26)、内部スイッチ35を解放して電源をオンにする(S27)。

【0074】この実施の形態例によれば、外部装置(例えばパソコン)から電源のオフ制御を行なうことができる。本発明では、パソコンからユーティリティソフト等を動作させて、前述した発明の機能を使用するかしないかユーザが選択したり、待ち時間の設定の指示ができる。

【0075】例えば、電源オンの時、外部スイッチ22が押された時に前記第1のインタフェース(SCSIインタフェース)にあるコマンドを発行し、特定のレスポンスが前記外部記憶ユニット10から返ってきたら電源をオフにするか、外部スイッチ22が押されたらすぐに電源をオフにするかの選択を前記第2のインタフェースを介してユーザが指示できるようにすることができる。

【0076】このように構成すれば、外部記憶ユニット10から特定のレスポンスが返ってきてから電源をオフにするか、或いは外部スイッチ22が押されたらすぐに電源をオフにするかの選択をパソコン1から設定することができる。必要に応じた電源のオフ制御を行なうことができる。

【0077】また、電源オンの時、外部スイッチ22が押された時に前記第2のインタフェース(USBインタフェース)から前記外部記憶ユニット10に対するコマンドが無いのを一定時間確認し、一定時間無い時には前記第1のインタフェースにあるコマンドを発行し、特定のレスポンスが外部記憶ユニット10から返ってきたら電源をオフにするか、外部スイッチ22が押されたらすぐに電源をオフにするかの選択を第2のインタフェースを介して指示できるようにすることができる。

【0078】このように構成すれば、外部記憶ユニット10に一定時間コマンドが無い場合に、外部記憶ユニット10から特定のレスポンスが返ってきてから電源をオフにするか、或いは外部スイッチ22が押されたらすぐに電源をオフにするかの選択や時間設定をパソコン1からすることができ、必要に応じた電源のオフ制御を行なうことができる。

【0079】また、第2のインタフェース(USBインタフェース)から前記外部記憶ユニット10に対する要求が一定時間無い時には、電源をオフにするかどうかの選択や一定時間の設定を第2のインタフェースを介して指示できるようにすることができる。

【0080】このように構成すれば、外部記憶ユニット10に対する要求が一定時間無い時に、電源をオフにするかどうかの選択や時間設定をパソコンからできる。必要に応じた電源のオフ制御を行なうことができる。

【0081】また、外部記憶ユニット10はリムーバブルメディアであり、該メディアが外部記憶ユニット10に入っていない状態が一定時間経過した時は、電源をオフにするかどうかの選択を前記第2のインタフェースを介して指示できるようにすることができる。

【0082】このように構成すれば、リムーバブルメディアが外部記憶ユニットに入っていない状態が一定時間経過した時に、電源をオフにするかどうかの選択や時間設定をパソコンからできるので、必要に応じた電源のオフ制御を行なうことができる。

【0083】また、決まった時間の設定を前記第2のインタフェースを介して指示できるようにすることができる。このように構成すれば、決まった時間の設定をパソコンから指示でき、必要に応じた電源のオンオフ制御を行なうことができる。

【0084】

【発明の効果】以上、詳細に説明したように、本発明によれば、以下の効果を得られる。

(1) 請求項1記載の発明によれば、外部記憶ユニットに全てのデータが書き込まれた時に、外部記憶ユニットから返ってくる特定のレスポンスを受けると、電源をオフにするので、外部記憶ユニットに確実にデータを書き込んでから電源をオフにすることができる。

【0085】(2) 請求項2記載の発明によれば、第2のインタフェースから前記外部記憶ユニットに対するコマンドが一定時間無い場合に、外部記憶ユニットに全てのデータが書き込まれた時に、外部ユニットから返ってくる特定のレスポンスを受けると、電源をオフにするので、外部記憶ユニットにパソコンを送る全てのデータを確実に書き込んでから電源をオフにすることができる。

【0086】(3) 請求項3記載の発明によれば、第2のインタフェースから外部記憶ユニットに対する要求が一定時間無い場合には、電源をオフにして、外部記憶ユニットの無駄な電力消費を抑えることができる。

【0087】(4) 請求項4記載の発明によれば、リムーバブルメディアが外部記憶ユニットに入っていない状態が一定時間続く時には電源をオフにすることにより、外部記憶ユニットの無駄な電力消費を抑えることができる。

【0088】(5) 請求項5記載の発明によれば、パソコンのバックアッププログラムと連携し、自動バックアップを行なうことができる。

(6) 請求項6記載の発明によれば、外部記憶ユニットから特定のレスポンスが返ってきてから電源をオフにするか、或いは外部スイッチが押されたらすぐに電源をオフにするかの選択をパソコンから設定することができる、必要に応じた電源のオフ制御を行なうことができる。

【0089】(7) 請求項7記載の発明によれば、外部記憶ユニットに一定時間コマンドが無い場合に、外部記憶ユニットから特定のレスポンスが返ってきてから電源をオフにするか、或いは外部スイッチが押されたらすぐに電源をオフにするかの選択や時間設定をパソコンから行うことができ、必要に応じた電源のオフ制御を行なうことができる。

【0090】(8) 請求項8記載の発明によれば、外部記憶ユニットに対する要求が一定時間無い時に、電源をオフにするかどうかの選択や時間設定をパソコンからできるので、必要に応じた電源のオフ制御を行なうことができる。

【0091】(9) 請求項9記載の発明によれば、リムーバブルメディアが外部記憶ユニットに入っていない状態が一定時間経過した時に、電源をオフにするかどうかの選択や時間設定をパソコンからできるので、必要に応じた電源のオフ制御を行なうことができる。

【0092】(10) 請求項10記載の発明によれば、決まった時間の設定をパソコンから指示でき、必要に応じた電源のオンオフ制御を行なうことができる。

(11) 請求項11記載の発明によれば、外部装置から電源のオフ制御を行なうことができる。

【0093】このように、本発明によれば、外部記憶ユニットに確実にデータを書き込んでから電源をオフにすることができる外部記憶装置の電源制御回路を提供することができる。また、上記の電源制御が既存の外部記憶ユニットのソフトに変更を必要とせずに行なえる。

【図面の簡単な説明】

【図1】本発明の第1の実施の形態例を示すブロック図である。

【図2】本発明の第1の動作例を示すフローチャートである。

【図3】本発明の第2の実施の形態例を示すブロック図である。

【図4】外部スイッチの構成例を示す図である。

【図5】本発明の第3の実施の形態例を示すブロック図である。

【図6】本発明の第2の動作例を示すフローチャートである。

【図7】本発明の第3の動作例を示すフローチャートである。

【図8】本発明の第4の動作例を示すフローチャートである。

【図9】本発明の第5の動作例を示すフローチャートである。

【図10】パソコンと外部記憶装置を示す図である。

【図11】USB又はIEEE1394インタフェース付外部記憶装置の外観構成例を示す図である。

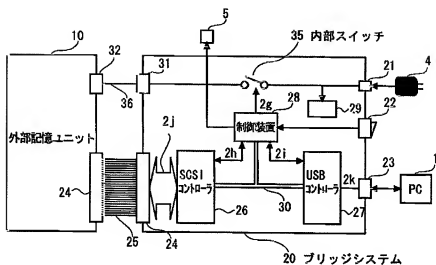
【図12】USB又はIEEE1394インタフェース付外部記憶装置の従来構成例を示すブロック図である。

【符号の説明】

- 1 パソコン
- 4 電源
- 5 LED
- 10 外部記憶ユニット
- 20 ブリッジシステム
- 21 電源ジャック
- 22 外部スイッチ
- 23 コネクタ
- 24 SCSIインタフェース
- 25 ケーブル
- 26 SCSIコントローラ
- 27 USBコントローラ
- 28 制御装置(CPU)
- 29 ブリッジ用電源
- 30 データバス
- 31、32 コネクタ
- 35 内部スイッチ
- 36 電源供給ライン

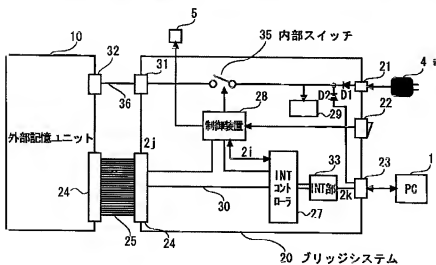
【図1】

本発明の第1の実施の形態例を示すブロック図



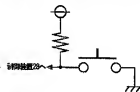
【図3】

本発明の第2の実施の形態例を示すブロック図



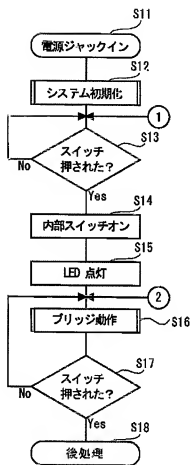
【図4】

外部スイッチの構成例を示す図



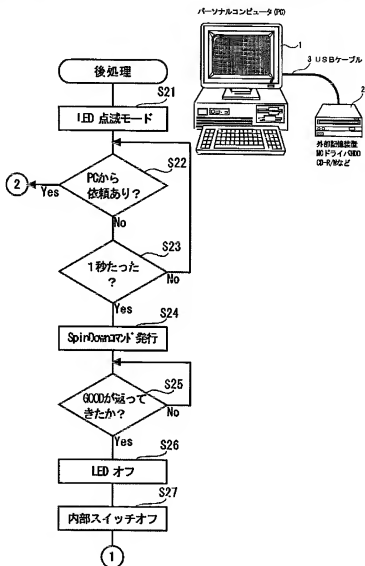
【図2】

本発明の第1の動作例を示すフローチャート



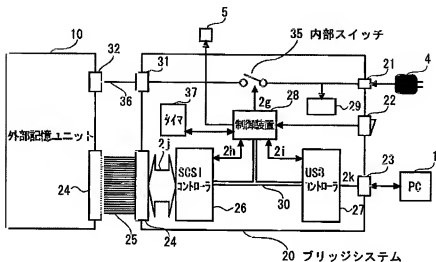
【図10】

パソコンと外部記憶装置を示す図



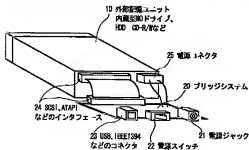
【図5】

本発明の第3の実施の形態例を示すブロック図



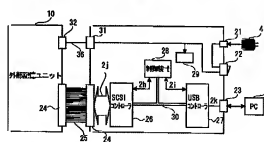
【図11】

USB又はIEEE1394インタフェース付外部記憶装置の外形構成例を示す図



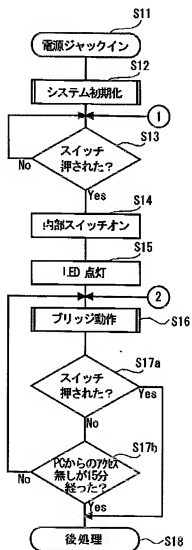
【図12】

USB又はIEEE1394インタフェース付外部記憶装置の従来構成例を示すブロック図



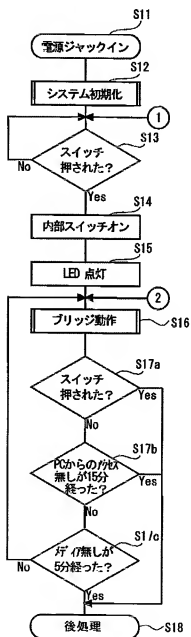
【図6】

本発明の第2の動作例を示すフローチャート



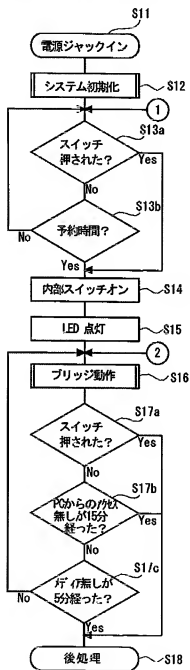
【図7】

本発明の第3の動作例を示すフローチャート



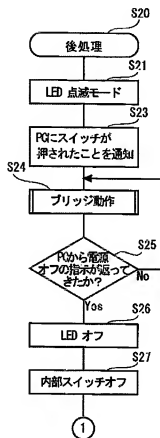
【図8】

本発明の第3の動作例を示すフローチャート



【 図 9 】

本発明の第 5 の動作例を示すフローチャート



フロントページの続き

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CLAIMS

[Claim(s)]

[Claim 1]Have the following, and if it detects that said Out switch was pushed at the time of a power turn, said control device, A control circuit of an external storage releasing said internal switch and turning OFF a power supply if a command in the 1st interface is published and a specific response returns from an external memory unit.

An external memory unit which memorizes data.

The 1st interface connected with this external memory unit.

The 2nd interface for connecting with an external instrument.

A device which changes a data format of this 1st interface and the 2nd interface, a control device which controls the whole operation, an internal switch for supplying a power supply to said external memory unit, and an Out switch which gives an on-off signal of a power supply.

[Claim 2]If it detects that said Out switch was pushed at the time of a power turn, said control device, The fixed time check of the thing without a command or data to said said external memory unit from the 2nd interface is carried out. A control circuit of the external storage according to claim 1 releasing said internal switch and turning OFF a power supply if a command in said 1st interface is published and a specific response returns from an external memory unit when there is no fixed time.

[Claim 3]A control circuit of the external storage according to any one of claims 1 to 2 releasing said internal switch from said 2nd interface when there is no command over said external memory unit in fixed time, and turning OFF a power supply.

[Claim 4]When the state where said external memory unit is a removable media drive unit, and these media are not contained in an external memory unit carries out fixed time lapse, A control circuit of the external storage according to any one of claims 1 to 3 releasing said internal switch and turning OFF a power supply.

[Claim 5]a time check which times time — a control circuit of the external storage according to any one of claims 1 to 4 making a power supply one or turning it OFF if a means is provided and it becomes at regular time.

[Claim 6]A command which is in said 1st interface at the time of a power turn when said Out switch is pushed is published. A control circuit of the external storage according to claim 1 being able to direct selection of whether a power supply will be turned OFF if a specific response returns from said external memory unit, or to turn OFF a power supply immediately after an Out switch is pushed via said 2nd interface.

[Claim 7]At the time of a power turn, when said Out switch is pushed, the fixed time check of the thing without a command over said external memory unit is carried out from said 2nd interface. A command which is in said 1st interface when there is no fixed time is published, A control circuit of the external storage according to claim 2 being able to direct selection of whether a power supply will be turned OFF if a specific response returns from an external memory unit, or to turn OFF a power supply immediately after an Out switch is pushed via the 2nd interface.

[Claim 8]A control circuit of the external storage according to claim 3 being able to direct

selection of whether to turn OFF a power supply via the 2nd interface from said 2nd interface when there is no demand to said external memory unit in fixed time.

[Claim 9] When the state where said external memory unit is a removable media drive unit, and these media are not contained in an external memory unit carries out fixed time lapse, A control circuit of the external storage according to claim 4 being able to direct selection of whether to turn OFF a power supply via said 2nd interface.

[Claim 10] A control circuit of the external storage according to claim 5 being able to direct setting out of regular time via said 2nd interface.

[Claim 11] A control circuit of the external storage according to claim 1 when said Out switch is pushed at the time of a power turn, wherein it notifies said control device to an external device through the 2nd interface and it turns OFF a power supply with directions of this external device.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the control circuit of external memory storage, such as a personal computer (it abbreviates to a personal computer or PC below), in more detail about the control circuit of an external storage.

[0002]

[Description of the Prior Art] The external storage of the personal computer MO (optical-magnetic disc equipment), HDD (hard disk unit), and CD-R/W with modern interfaces, such as USB and IEEE1394, has appeared briskly. Drawing 10 is a figure showing a personal computer and an external storage. In the figure, 1 is a personal computer and is connected with the external storage 2 via USB cable 3.

[0003] Many of these external storages have many which have added the bridge system to the external memory unit (what is called a built-in MO drive, HDD, CD-R/W) with interfaces, such as the existing ATAPI and SCSI. The reason is as follows.

[0004] ** Development of an external memory unit with a new interface and mass production take immense expense and period.

** At present, it cannot be decided which [of a new interface] becomes in use.

[0005] Since it is above, it is because a merit has many directions which develop or purchase the bridge system which changes ATAPI and SCSI into USB, IEEE1394, etc., and carry out external [of this].

[0006] Drawing 11 is a figure showing the example of appearance composition of USB or an external storage with an IEEE1394 interface. The conventional external memory unit 10 is made available by adding the bridge system 20 to the conventional external memory unit 10. The bridge system 20 is realized by attaching various kinds of necessary parts to a substrate. In the bridge system 20, a power supply jack and 22, an electric power switch and 23 are the interfaces of SCSI, ATAPI, etc., and 21 is connected with the bridge system 20 for connectors, such as USB and IEEE1394, and 24. Thus, the existing SCSI and the storage unit using an ATAPI interface can be used as USB and memory storage corresponding to IEEE1394 by forming a bridge system.

[0007] Improvement in the speed of an external memory unit is also desired with improvement in the speed of a personal computer, and improvement in the speed of an interface. Then, by collecting MO, HDD, and the data that stacks the high-speed semiconductor memory called the quick cash of access, and is transmitted from CD-R/W here temporarily, access as an external storage can be seemingly made quick, and a personal computer can be released early.

[0008] Drawing 12 is a block diagram showing the example of the conventional composition of USB or an external storage with an IEEE1394 interface. The same thing as drawing 10 attaches and shows the same numerals. The external memory unit 10 and the bridge system 20 are connected via the cable 25. 24 is a SCSI interface to which the cable 25 is connected.

[0009] In the bridge system 20, it is a USB controller (the 2nd interface controller) by which 26 is connected with a SCSI controller (the 1st interface controller), and 27 is connected with this SCSI controller 26. 28 is a control device which connects between SCSI controller 26 and USB

controller 27 via the data bus 30. As this control device 28, CPU is used, for example.

[0010]2 is the 1st interface signal that flows between SCSI controller 26 and SCSI interface 24. 1 is a personal computer and is connected with USB connector 23. 2k is the 2nd interface signal that flows between USB controller 27 and USB connector 23.

[0011]It is a power supply jack to which a power supply is connected to 4 and this power supply 4 is connected 21. The power supply inputted from this power supply jack 21 is supplied to the inside of a bridge system via the electric power switch 22. 29 is a power supply for bridges. The power for operating the bridge system 20 from this power supply 29 is supplied. A power supply is supplied also to the external memory unit 10 side via the connector 31, the connector 32, and the power supply line 36.

[0012]In the device constituted in this way, the control device 28 performs the interconversion between a USB interface and a SCSI interface via the control signal 2h for the 1st interface and the control signal 2i for the 2nd interface, and the data bus 30. Thereby, the data from the personal computer 1 goes into the bridge system 20 from USB controller 27, is changed into the data for SCSI interfaces, and is written in the external memory unit 10. That is, it becomes possible to write data to the external memory unit 10 using the conventional SCSI interface using a USB interface.

[0013]

[Problem(s) to be Solved by the Invention]USB and IEEE1394 have a hot plug function (function which can turn OFF a power supply when not using it), and when not using apparatus, they can cut a power supply at any time. However, the external memory unit with said cash will notify the completion of a copy to the personal computer 1, if all the file transfers are completed including the part collected on cash when a big file is copied from the personal computer 1.

[0014]It tells that the personal computer 1 carried out a display or non-display ** of the dialog etc. on the screen, and the copy ended it to the user. However, since write-in work is not actually completed only by being actually stocked by cash, if a power supply is turned OFF at this time, message data collected on cash will disappear.

[0015]In order to prevent such an accident, there is art given in JP,8-95715,A. However, in this invention, a busy announcement means is needed also for the external memory unit 10. Therefore, the problem of being inapplicable is among the external memory units which attached the bridge system to said existing external memory unit 10.

[0016]This invention is made in view of such a technical problem, and it aims at providing the control circuit of the external storage which can turn OFF a power supply after writing data in the existing external memory unit certainly.

[0017]

[Means for Solving the Problem](1) An external memory unit in which the invention according to claim 1 memorizes data, The 1st interface connected with this external memory unit, and the 2nd interface for connecting with an external instrument, A device which changes a data format of this 1st interface and the 2nd interface, A control device which controls the whole operation, and an internal switch for supplying a power supply to said external memory unit, Provide an Out switch which gives an on-off signal of a power supply, and if it detects that said Out switch was pushed at the time of a power turn, said control device, If a command in the 1st interface is published and a specific response returns from an external memory unit, said internal switch will be released and a power supply will be turned OFF.

[0018]Since a power supply will be turned OFF if are constituted in this way and a specific response to which it comes on the contrary will be received from an external memory unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing data in an external memory unit certainly.

[0019](2) If it detects that said Out switch was pushed at the time of a power turn, the invention according to claim 2 said control device, The fixed time check of the thing without a command or data to said said external memory unit from the 2nd interface is carried out, If a command in said 1st interface is published and a specific response returns from an external memory unit when there is no fixed time, said internal switch will be released and a power supply will be turned OFF.

[0020] If constituted in this way, in fixed time, a command over said external memory unit from the 2nd interface when there is nothing. Since a power supply will be turned OFF if a specific response to which it comes on the contrary is received from an external unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing certainly all the data which a personal computer sends in an external memory unit.

[0021] (3) The invention according to claim 3 releases said internal switch from said 2nd interface, when there is no command over said external memory unit in fixed time, and it turns OFF a power supply.

[0022] From the 2nd interface, if constituted in this way, when there is no demand to an external memory unit in fixed time, a power supply can be turned OFF and useless power consumption of an external memory unit can be held down.

[0023] (4) When the state where said external memory unit is a removable media drive unit, and these media are not contained in an external memory unit carries out fixed time lapse of the invention according to claim 4, it releases said internal switch and turns OFF a power supply.

[0024] If constituted in this way, when the state where a removable media is not contained in an external memory unit continues fixed time, useless power consumption of an external memory unit can be held down by turning OFF a power supply.

[0025] (5) a time check which the invention according to claim 5 figures out for time — if a means is provided and it becomes at regular time, a power supply will be made one or will be turned OFF. If constituted in this way, it can cooperate with a backup program of a personal computer, and automatic backup can be performed.

[0026] (6) The invention according to claim 6 publishes a command which is in said 1st interface at the time of a power turn when said Out switch is pushed. If a specific response returns from said external memory unit, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be directed via said 2nd interface.

[0027] If constituted in this way, after a specific response returns from an external memory unit, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be set up from a personal computer, and OFF control of a power supply as occasion demands can be performed.

[0028] (7) At the time of a power turn, the invention according to claim 7 carries out the fixed time check of the thing without a command over said external memory unit from said 2nd interface, when said Out switch is pushed. If a command in said 1st interface is published and a specific response returns from an external memory unit when there is no fixed time, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be directed via the 2nd interface.

[0029] If constituted in this way, when there will be no fixed time command in an external memory unit, After a specific response returns from an external memory unit, selection and time setting of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be carried out from a personal computer, and OFF control of a power supply as occasion demands can be performed.

[0030] (8) From said 2nd interface, the invention according to claim 8 can direct selection of whether to turn OFF a power supply via the 2nd interface, when there is no demand to said external memory unit in fixed time.

[0031] Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when there is no demand to an external memory unit in fixed time if constituted in this way, OFF control of a power supply as occasion demands can be performed.

[0032] (9) Said external memory unit of the invention according to claim 9 is a removable media drive unit, When the state where these media are not contained in an external memory unit carries out fixed time lapse, selection of whether to turn OFF a power supply can be directed via said 2nd interface.

[0033] Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when are constituted in this way and the state where a removable media is not contained in an external memory unit carries out fixed time lapse, OFF control of a power supply as occasion demands can be performed.

[0034](10) The invention according to claim 10 can direct setting out of regular time via said 2nd interface. If constituted in this way, setting out of regular time can be directed from a personal computer, and on-off control of a power supply as occasion demands can be performed.

[0035](11) When said Out switch is pushed at the time of a power turn as for the invention according to claim 11, notify said control device to an external device through the 2nd interface, and it turns OFF a power supply with directions of this external device.

[0036] If constituted in this way, OFF control of a power supply can be performed from an external device.

[0037]

[-- an embodiment of the invention -- example] referring to drawings hereafter -- an embodiment of the invention -- an example is explained in detail. Drawing 1 is a block diagram showing an example of 1 embodiment of this invention. The same thing as drawing 12 attaches and shows the same numerals. It differs in that an example of an embodiment shown in a figure changed a point that the internal switch 35 was added to a lineblock diagram of drawing 12, and Out switch 22 to what is shown in Drawing 4 from what turns current on and off, and other components are the same as drawing 11. The external memory unit (for example, MO drive) 10 and the bridge system 20 are connected in the SCSI cable 25 and the power supply line 36.

[0038] The bridge system 20 is [from the power supply 4] on via the power supply jack 21. As for the power supply included in the bridge system 20, the power supply for operation of the bridge system 20 is created by the power supply 29 for bridges. On the other hand, the external memory unit 10 is [which was turned on from the power supply jack 21] on via the power supply line 36 via the internal switch 35.

[0039] The personal computer 1 is connected with USB controller 27 via the connector 23. This USB controller 27 is connected with SCSI controller 26 via the data bus 30. The control device 28 is connected with SCSI controller 26 and USB controller 27 via the data bus 30. From the control device 28, the on-off control signal 2g is outputted to the internal switch 35.

[0040] The electric power switch (Out switch) 22 gives the signal of low AKUCHIBU to the control device 28, as shown in drawing 4. That is, when Out switch 22 is pushed, the signal of the "L" level is given to the control device 28. 5 is LED controlled from the control device (henceforth CPU) 28. This LED5 displays power supply turning on and off.

[0041] The command sent through a USB cable from the personal computer 1, data, etc. are changed into the form which can be processed by CPU28 from a USB protocol with USB controller 27. This is changed and sent to the form that CPU28 can treat SCSI controller 26. SCSI controller 26 is changed into a SCSI protocol, and is sent to the external memory unit 10. The command and data transfer to the personal computer 1 from the external memory unit 10 follow the reverse. Thus, the inverter described by claim 1 shows USB controller 27, SCSI controller 26, and CPU28 here. It will be as follows if operation of the device constituted in this way is explained referring to the flow chart of drawing 2.

[0042] Drawing 2 is a flow chart which shows the 1st example of this invention of operation. If the power supply 4 is connected to the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13).

[0043] If Out switch 22 is pushed, CPU28 will make the internal switch 35 one, will supply a power supply to the external memory unit 10 (S14), and will turn on LED5 (S15). It can recognize that the power supply was turned on because this LED5 lights up.

[0044] Then, CPU28 performs bridge operation using USB controller 27 and SCSI controller 26, and makes the personal computer 1 and the external memory unit 10 communicate well (S16). If Out switch 22 is pushed when the internal switch 35 is one (S17), CPU28 will go into post-processing for power OFF (S18).

[0045] In post-processing, an operator is told about CPU28 having blinked LED5 and having gone into post-processing (S21). Then, the fixed time check of whether there is any data copy request from the personal computer 1 is carried out (S22). The data sent from the personal computer 1 is divided and sent to a small block. Therefore, it is necessary to confirm whether sending out of all the data of the personal computer 1 finished with Step S22.

[0046]When there are data transfer requests again from the personal computer 1, it returns to Step S16 and bridge operation is performed. When there are no data transfer requests, it is confirmed whether CPU28 left for 1 second, using a soft timer (S23). When there are no data transfer requests of 1 seconds or more, CPU28 publishes a command command specific next to the external memory unit 10 via SCSI controller 26 (S24).

[0047]When the external memory unit 10 has cash as the reason, it is because it tells that processing ended the external memory unit 10 via SCSI controller 26 to the bridge system 20 even if writing processing is not completed to nonvolatile memory (actual HD, MO, and the CD itself).

[0048]CPU28 which received this processing terminating notice needs to recognize that all the data that should be written in the cash (not shown) in the external memory unit 10 was assembled, and needs to detect that the writing to the storage was completed certainly next. Therefore, for example, CPU28 publishes a spin down (Spindown) command, when the 1st interface is SCSI (S24). Here, a spin down command is a signal for stopping rotation of MO, for example. CPU (not shown) in the external memory unit 10 returns GOOD KONDESHON to the bridge system 20, after the data writing to a storage is completed in response to a spin down command. Here, a command is not limited only to a spin down. Ejection may be sufficient as long as it is a removable media drive unit. However, finally media are discharged.

[0049]If GOOD KONDESHON returns from the external memory unit 10 (S25), CPU28 will turn OFF LEDs (S26) and will turn OFF the internal switch 35 (S27). In this state, the current supply to the external memory unit 10 is severed. Next, it returns to Step S13 and waits to push Out switch 22.

[0050]Since a power supply will be turned OFF if according to this example of an embodiment the specific response (here GOOD KONDESHON) to which it comes on the contrary is received from the external memory unit 10 when all the data is written in the external memory unit 10, A power supply can be turned OFF after writing certainly all the data which the personal computer 1 sends in the external memory unit 10.

[0051]Drawing 3 is a block diagram showing the 2nd example of an embodiment of this invention. The same thing as drawing 1 attaches and shows the same numerals. This example of an embodiment shows the circuit at the time of using an ATAPIO interface as the external memory unit 10. In this case, the 1st interface controller as shown in drawing 1 becomes unnecessary. It is connected with the connector 23 via the interface part 33, and the interface controller 27 is connected with the personal computer 1.

[0052]Here, the thing for IEEE1394 is used as the interface controller 27. Since the communication wire for IEEE1394 contains the line for power supplies in an inside, when a power supply can be supplied from the personal computer 1, the power source wire is also connected with the connector 23. In this case, a power supply is connected to a power source line via the diode D2 for prevention of backflow. On the other hand, the power supply from the power supply 4 is also connected to the power source line via the diode D1 for prevention of backflow via the power supply jack 21. As a result, the power supply for operating the bridge system 20 can be supplied from the personal computer 1 and power supply 4 side, and the parallel run of a power supply becomes possible via the diode D1 for prevention of backflow, and D2.

[0053]The control device (CPU) 28 is connected with the interface controller 27 and the ATAPIO interface 24 via the data bus 30. In the system constituted in this way, the case where the power supply 29 for bridges is supplied by the ON signal from Out switch 22 is considered. When the data writing demand to the external memory unit 10 from the personal computer 1 occurs, the data based on IEEE1394 from the personal computer 1, it can go into the interface controller 27 via the interface part 33, the control signal for an interface can be exchanged between CPU28, and the data of IEEE1394 conformity can be changed into the data of ATAPIO. The data changed into ATAPIO form is once stored in the cash of the external memory unit 10, and is written in a storage after that.

[0054]Here, cash's memory of all the data will output a processing end signal to it from the external memory unit 10 to the bridge system 20. CPU28 which received this processing end signal publishes a specific command (for example, Spindown) to the external memory unit 10. In

the external memory unit 10 which received this command, when the data writing to a storage is completed, a data writing completion (GOOD KONDESHON) signal is outputted from internal CPU. If this GOOD KONDESHON signal is received, CPU28 will control the internal switch 35 and will release a point of contact. Thereby, the power supply currently supplied to the external memory unit 10 becomes **.

[0055] Since a power supply will be turned OFF if also in this example of an embodiment the specific response (here GOOD KONDESHON) to which it comes on the contrary is received from the external memory unit 10 when all the data is written in the external memory unit 10, A power supply can be turned OFF after writing certainly all the data which the personal computer 1 sends in the external memory unit 10.

[0056] According to the example of an embodiment mentioned above, it is effective in the ability to carry out without the above-mentioned power control needing change for the software of the existing external memory unit or a personal computer. Drawing 5 is a block diagram showing the 3rd example of an embodiment of this invention. The same thing as drawing 1 attaches and shows the same numerals. In the figure, 37 is the timer formed in the bridge system 20, and is connected with CPU28. This timer 37 clocks time and is backed up with the battery. Therefore, even if the power supply of a circuit becomes **, the timer 37 continues mincing time. Other composition is completely the same as the composition of drawing 1. Operation of this invention is explained using the system constituted in this way.

[0057] Drawing 6 is a flow chart which shows the 2nd example of this invention of operation. If the power supply 4 is connected with the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13).

[0058] If Out switch 22 is pushed, it will supply a power supply to the external memory unit 10 (S14), and will turn on LED5 (S15). [CPU28] [the internal switch 35] Then, CPU28 performs bridge operation using SCSI controller 26 and USB controller 27, and makes the personal computer 1 and the external memory unit 10 communicate well (S16).

[0059] Next, after bridge operation is completed, CPU28 goes the time of the timer 37 to reading. On the other hand, CPU28 confirms whether Out switch 22 was pushed (S17a). When Out switch 22 is pushed, it goes into post-processing (S18). When Out switch 22 is not pushed, CPU28 counts time without access from the personal computer 1 using the timer 37 (S17b). That is, time when there is finally access is read and subsequent lapsed time will be counted. When there is access from the personal computer 1, CPU28 disregards the read time information.

[0060] When there is access from the personal computer 1, it returns to Step 16 and bridge operation is performed. When the state where there is no access from the personal computer 1 passes for 15 minutes, CPU28 goes into post-processing (S18). Post-processing is the completely same processing as post-processing shown in drawing 2. The connection from ** of a figure and ** also corresponds with the sequence of post-processing of drawing 2.

[0061] According to this example of an embodiment, from the 2nd interface, when there is no demand to an external memory unit in fixed time, a power supply can be turned OFF and the useless power consumption of an external memory unit can be held down.

[0062] Drawing 7 is a flow chart which shows the 3rd example of this invention of operation. Drawing 5 is used as a system configuration. If the power supply 4 is connected with the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13).

[0063] If Out switch 22 is pushed, it will supply a power supply to the external memory unit 10 (S14), and will turn on LED5 (S15). [CPU28] [the internal switch 35] Then, CPU28 performs bridge operation using SCSI controller 26 and USB controller 27, and makes the personal computer 1 and the external memory unit 10 communicate well (S16).

[0064] Next, after bridge operation is completed, CPU28 confirms whether Out switch 22 was pushed (S17a). In this case, CPU28 memorizes the time which had the last access from the personal computer 1. When Out switch 22 is pushed, it goes into post-processing (S18). When Out switch 22 is not pushed, it is confirmed whether those without access from the personal

computer 1 passed for 15 minutes (S17b). CPU28 goes to read the time information of the timer 37, and the passage of time for these 15 minutes is counted by deducting time with the last access from said personal computer 1.

[0065]When those without access from the personal computer 1 pass for 15 minutes, it goes into post-processing (S18). When those without access from the personal computer 1 do not pass for 15 minutes, CPU28 confirms whether those without a removable media (it abbreviates to media below) passed for 5 minutes (S17c). In this case, CPU28 will not go to read the timer 37, if media are inserted. And if media are drawn out, CPU28 will go to read the timer 37 and will memorize the time at that time. And if those without media pass for 5 minutes, it will go into post-processing (S18). The sequence of post-processing is completely the same as that of what was shown in drawing 2. The connection from ** of a figure and ** also corresponds with the sequence of post-processing of drawing 2.

[0066]According to this example of an embodiment, when the state where the removable media is not contained in the external memory unit 10 continues beyond in fixed time, the useless power consumption of the external memory unit 10 can be held down by turning OFF a power supply.

[0067]Drawing 8 is a flow chart which shows the 4th example of this invention of operation. Drawing 5 is used as a system configuration. If the power supply 4 is connected with the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. In this case, the reserved period shall be beforehand memorized by CPU28. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13a). When Out switch 22 is pushed, it progresses to the processing after Step S14.

[0068]When Out switch 22 is not pushed, it waits to push Out switch 22. If it goes to read the timer 37 in the meantime and the time of the timer 37 becomes a reserved period, CPU28 will detect that and will make the internal switch 35 one (S13). As a result, a power supply comes to be supplied to the external memory unit 10. Simultaneously, LED5 is turned on (S15). Then, CPU28 performs bridge operation using SCSI controller 26 and USB controller 27, and makes the personal computer 1 and the external memory unit 10 communicate well (S16).

[0069]Next, after bridge operation is completed, CPU28 confirms whether Out switch 22 was pushed (S17a). In this case, CPU28 memorizes the time which had the last access from the personal computer 1. When Out switch 22 is pushed, it goes into post-processing (S18). When Out switch 22 is not pushed, it is confirmed whether those without access from the personal computer 1 passed for 15 minutes (S17b). CPU28 goes to read the time information of the timer 37, and the passage of time for these 15 minutes is counted by deducting time with the last access from said personal computer 1.

[0070]When those without access from the personal computer 1 pass for 15 minutes, it goes into post-processing (S18). When those without access from the personal computer 1 do not pass for 15 minutes, CPU28 confirms whether those without a removable media (it abbreviates to media below) passed for 5 minutes (S17c). In this case, CPU28 will not go to read the timer 37, if media are inserted. And if media are drawn out, CPU28 will go to read the timer 37 and will memorize the time at that time. And if those without media pass for 5 minutes, it will go into post-processing (S18). The sequence of post-processing is completely the same as that of what was shown in drawing 2. The connection from ** of a figure and ** also corresponds with the sequence of post-processing of drawing 2.

[0071]According to this example of an embodiment, it can cooperate with the backup program of the personal computer 1, and automatic backup can be performed. Drawing 9 is a flow chart which shows the 5th example of this invention of operation. It enables it to perform OFF control of the power supply of an external storage from an external device (for example, personal computer) in this example of an embodiment. The figure shows post-processing and is the same as that of what mentioned post-processing already. In an old invention, although the control device (CPU) 28 had published the command of the spin down, by this invention, it is made to publish the command of a spin down from the external device (for example, personal computer) side. The personal computer side also directs permission of power OFF. Drawing 1 is used as a system configuration.

[0072] If it goes into post-processing (S20), it will tell having blinked LED5 and having gone into post-processing (S21). If Out switch 22 is pushed, CPU28 will report that the switch was pushed on the personal computer 1 through the 2nd interface (USB interface) (S23).

[0073] It continues bridge operation until CPU28 has directions of power OFF from the personal computer 1 (S24, S25). The personal computer 1 will publish a spin down command to an external storage, if it finishes discharging all the data. If GOOD KONDESHON comes on the contrary from an external storage, it can recognize that all the data was written in nonvolatile memory, and power OFF will be directed to CPU28 of an external storage (S24, S25). CPU28 turns OFF LED5 in response to the directions from the personal computer 1 (S26), releases the internal switch 35, and turns OFF a power supply (S27).

[0074] According to this example of an embodiment, OFF control of a power supply can be performed from an external device (for example, personal computer). In this invention, utility software etc. are operated from a personal computer and it does not carry out whether the function of an invention mentioned above is used, or a user chooses or directions of setting out of waiting time can be performed.

[0075] For example, the command which is in said 1st interface (SCSI interface) at the time of a power turn when Out switch 22 is pushed is published, a power supply is turned OFF, immediately after turning OFF a power supply or pushing Out switch 22, if a specific response returns from said external memory unit 10 — a user can direct that selection via said 2nd interface — it can be made like.

[0076] If constituted in this way, after a specific response returns from the external memory unit 10, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after Out switch 22 is pushed can be set up from the personal computer 1, and OFF control of a power supply as occasion demands can be performed.

[0077] At the time of a power turn, when Out switch 22 is pushed, the fixed time check of the thing without the command over said external memory unit 10 is carried out from said 2nd interface (USB interface). The command which is in said 1st interface when there is no fixed time is published. When a specific response returns from the external memory unit 10, it can make it possible to direct selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after Out switch 22 is pushed via the 2nd interface.

[0078] If constituted in this way, when there will be no fixed time command in the external memory unit 10, After a specific response returns from the external memory unit 10, selection and time setting of whether a power supply is turned OFF or to turn OFF a power supply, immediately after Out switch 22 is pushed can be carried out from the personal computer 1, and OFF control of a power supply as occasion demands can be performed.

[0079] When there is no demand to said external memory unit 10 in fixed time, it can make it possible to direct selection of whether to turn OFF a power supply, and setting out of fixed time via the 2nd interface from the 2nd interface (USB interface).

[0080] Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when there is no demand to the external memory unit 10 in fixed time if constituted in this way, OFF control of a power supply as occasion demands can be performed.

[0081] The external memory unit 10 is a removable media, and when the state where these media are not contained in the external memory unit 10 carries out fixed time lapse, it can make it possible to direct selection of whether to turn OFF a power supply via said 2nd interface.

[0082] Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when are constituted in this way and the state where the removable media is not contained in the external memory unit carries out fixed time lapse, OFF control of a power supply as occasion demands can be performed.

[0083] It can make it possible to direct setting out of the regular time via said 2nd interface. If constituted in this way, setting out of the regular time can be directed from a personal computer, and on-off control of a power supply as occasion demands can be performed.

[0084]

[Effect of the Invention] As mentioned above, according to this invention, the following effects

are acquired as explained in detail.

(1) According to the invention according to claim 1, since a power supply will be turned OFF if the specific response to which it comes on the contrary is received from an external memory unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing data in an external memory unit certainly.

[0085](2) According to the invention according to claim 2, in fixed time, the command over said external memory unit from the 2nd interface when there is nothing. Since a power supply will be turned OFF if the specific response to which it comes on the contrary is received from an external unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing certainly all the data which a personal computer sends in an external memory unit.

[0086](3) According to the invention according to claim 3, from the 2nd interface, when there is no demand to an external memory unit in fixed time, a power supply can be turned OFF and the useless power consumption of an external memory unit can be held down.

[0087](4) According to the invention according to claim 4, when the state where the removable media is not contained in the external memory unit continues fixed time, the useless power consumption of an external memory unit can be held down by turning OFF a power supply.

[0088](5) According to the invention according to claim 5, it can cooperate with the backup program of a personal computer, and automatic backup can be performed.

(6) According to the invention according to claim 6, after a specific response returns from an external memory unit, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be set up from a personal computer, and OFF control of a power supply as occasion demands can be performed.

[0089](7) When there is no fixed time command in an external memory unit according to the invention according to claim 7, After a specific response returns from an external memory unit, selection and time setting of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be carried out from a personal computer, and OFF control of a power supply as occasion demands can be performed.

[0090](8) According to the invention according to claim 8, since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when there is no demand to an external memory unit in fixed time, OFF control of a power supply as occasion demands can be performed.

[0091](9) According to the invention according to claim 9, since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when the state where the removable media is not contained in the external memory unit carries out fixed time lapse, OFF control of a power supply as occasion demands can be performed.

[0092](10) According to the invention according to claim 10, setting out of the regular time can be directed from a personal computer, and on-off control of a power supply as occasion demands can be performed.

(11) According to the invention according to claim 11, OFF control of a power supply can be performed from an external device.

[0093] Thus, according to this invention, after writing data in an external memory unit certainly, the control circuit of the external storage which can turn OFF a power supply can be provided. It can carry out without the above-mentioned power control needing change for the software of the existing external memory unit.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention]This invention relates to the control circuit of external memory storage, such as a personal computer (it abbreviates to a personal computer or PC below), in more detail about the control circuit of an external storage.

[Translation done.]

* NOTICES *

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PRIOR ART

[Description of the Prior Art]The external storage of the personal computer MO (optical-magnetic disc equipment), HDD (hard disk unit), and CD-R/W with modern interfaces, such as USB and IEEE1394, has appeared briskly. Drawing 10 is a figure showing a personal computer and an external storage. In the figure, 1 is a personal computer and is connected with the external storage 2 via USB cable 3.

[0003]Many of these external storages have many which have added the bridge system to the external memory unit (what is called a built-in MO drive, HDD, CD-R/W) with interfaces, such as the existing ATAPI and SCSI. The reason is as follows.

[0004]** Development of an external memory unit with a new interface and mass production take immense expense and period.

** At present, it cannot be decided which [of a new interface] becomes in use.

[0005]Since it is above, it is because a merit has many directions which develop or purchase the bridge system which changes ATAPI and SCSI into USB, IEEE1394, etc., and carry out external [of this].

[0006]Drawing 11 is a figure showing the example of appearance composition of USB or an external storage with an IEEE1394 interface. The conventional external memory unit 10 is made available by adding the bridge system 20 to the conventional external memory unit 10. The bridge system 20 is realized by attaching various kinds of necessary parts to a substrate. In the bridge system 20, a power supply jack and 22, an electric power switch and 23 are the interfaces of SCSI, ATAPI, etc., and 21 is connected with the bridge system 20 for connectors, such as USB and IEEE1394, and 24. Thus, the existing SCSI and the storage unit using an ATAPI interface can be used as USB and memory storage corresponding to IEEE1394 by forming a bridge system.

[0007]Improvement in the speed of an external memory unit is also desired with improvement in the speed of a personal computer, and improvement in the speed of an interface. Then, by collecting MO, HDD, and the data that stacks the high-speed semiconductor memory called the quick cash of access, and is transmitted from CD-R/W here temporarily, access as an external storage can be seemingly made quick, and a personal computer can be released early.

[0008]Drawing 12 is a block diagram showing the example of the conventional composition of USB or an external storage with an IEEE1394 interface. The same thing as drawing 10 attaches and shows the same numerals. The external memory unit 10 and the bridge system 20 are connected via the cable 25. 24 is a SCSI interface to which the cable 25 is connected.

[0009]In the bridge system 20, it is a USB controller (the 2nd interface controller) by which 26 is connected with a SCSI controller (the 1st interface controller), and 27 is connected with this SCSI controller 26. 28 is a control device which connects between SCSI controller 26 and USB controller 27 via the data bus 30. As this control device 28, CPU is used, for example.

[0010]2j is the 1st interface signal that flows between SCSI controller 26 and SCSI interface 24. 1 is a personal computer and is connected with USB connector 23. 2k is the 2nd interface signal that flows between USB controller 27 and USB connector 23.

[0011]It is a power supply jack to which a power supply is connected to 4 and this power supply 4 is connected 21. The power supply inputted from this power supply jack 21 is supplied to the

inside of a bridge system via the electric power switch 22. 29 is a power supply for bridges. The power for operating the bridge system 20 from this power supply 29 is supplied. A power supply is supplied also to the external memory unit 10 side via the connector 31, the connector 32, and the power supply line 36.

[0012]In the device constituted in this way, the control device 28 performs the interconversion between a USB interface and a SCSI interface via the control signal 2h for the 1st interface and the control signal 2i for the 2nd interface, and the data bus 30. Thereby, the data from the personal computer 1 goes into the bridge system 20 from USB controller 27, is changed into the data for SCSI interfaces, and is written in the external memory unit 10. That is, it becomes possible to write data to the external memory unit 10 using the conventional SCSI interface using a USB interface.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention]As mentioned above, according to this invention, the following effects are acquired as explained in detail.

- (1) According to the invention according to claim 1, since a power supply will be turned OFF if the specific response to which it comes on the contrary is received from an external memory unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing data in an external memory unit certainly.
- [0085](2) According to the invention according to claim 2, in fixed time, the command over said external memory unit from the 2nd interface when there is nothing. Since a power supply will be turned OFF if the specific response to which it comes on the contrary is received from an external unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing certainly all the data which a personal computer sends in an external memory unit.
- [0086](3) According to the invention according to claim 3, from the 2nd interface, when there is no demand to an external memory unit in fixed time, a power supply can be turned OFF and the useless power consumption of an external memory unit can be held down.
- [0087](4) According to the invention according to claim 4, when the state where the removable media is not contained in the external memory unit continues fixed time, the useless power consumption of an external memory unit can be held down by turning OFF a power supply.
- [0088](5) According to the invention according to claim 5, it can cooperate with the backup program of a personal computer, and automatic backup can be performed.
- (6) According to the invention according to claim 6, after a specific response returns from an external memory unit, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be set up from a personal computer, and OFF control of a power supply as occasion demands can be performed.
- [0089](7) When there is no fixed time command in an external memory unit according to the invention according to claim 7, After a specific response returns from an external memory unit, selection and time setting of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be carried out from a personal computer, and OFF control of a power supply as occasion demands can be performed.
- [0090](8) According to the invention according to claim 8, since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when there is no demand to an external memory unit in fixed time, OFF control of a power supply as occasion demands can be performed.
- [0091](9) According to the invention according to claim 9, since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when the state where the removable media is not contained in the external memory unit carries out fixed time lapse, OFF control of a power supply as occasion demands can be performed.
- [0092](10) According to the invention according to claim 10, setting out of the regular time can be directed from a personal computer, and on-off control of a power supply as occasion demands can be performed.
- (11) According to the invention according to claim 11, OFF control of a power supply can be

performed from an external device.

[0093] Thus, according to this invention, after writing data in an internal memory unit certainly, the control circuit of the external storage which can turn OFF a power supply can be provided. It can carry out without the above-mentioned power control needing change for the software of the existing internal memory unit.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]USB and IEEE1394 have a hot plug function (function which can turn OFF a power supply when not using it), and when not using apparatus, they can cut a power supply at any time. However, the external memory unit with said cash will notify the completion of a copy to the personal computer 1, if all the file transfers are completed including the part collected on cash when a big file is copied from the personal computer 1.

[0014]It tells that the personal computer 1 carried out a display or non-display ** of the dialog etc. on the screen, and the copy ended it to the user. However, since write-in work is not actually completed only by being actually stocked by cash, if a power supply is turned OFF at this time, message data collected on cash will disappear.

[0015]In order to prevent such an accident, there is art given in JP,8-95715,A. However, in this invention, a busy announcement means is needed also for the external memory unit 10.

Therefore, the problem of being inapplicable is among the external memory units which attached the bridge system to said existing external memory unit 10.

[0016]This invention is made in view of such a technical problem, and it aims at providing the control circuit of the external storage which can turn OFF a power supply after writing data in the existing external memory unit certainly.

[Translation done.]

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MEANS

[Means for Solving the Problem](1) An external memory unit in which the invention according to claim 1 memorizes data, The 1st interface connected with this external memory unit, and the 2nd interface for connecting with an external instrument, A device which changes a data format of this 1st interface and the 2nd interface, A control device which controls the whole operation, and an internal switch for supplying a power supply to said external memory unit, Provide an Out switch which gives an on-off signal of a power supply, and if it detects that said Out switch was pushed at the time of a power turn, said control device, If a command in the 1st interface is published and a specific response returns from an external memory unit, said internal switch will be released and a power supply will be turned OFF.

[0018]Since a power supply will be turned OFF if are constituted in this way and a specific response to which it comes on the contrary will be received from an external memory unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing data in an external memory unit certainly.

[0019](2) If it detects that said Out switch was pushed at the time of a power turn, the invention according to claim 2 said control device, The fixed time check of the thing without a command or data to said said external memory unit from the 2nd interface is carried out, If a command in said 1st interface is published and a specific response returns from an external memory unit when there is no fixed time, said internal switch will be released and a power supply will be turned OFF.

[0020]If constituted in this way, in fixed time, a command over said external memory unit from the 2nd interface when there is nothing. Since a power supply will be turned OFF if a specific response to which it comes on the contrary is received from an external unit when all the data is written in an external memory unit, a power supply can be turned OFF after writing certainly all the data which a personal computer sends in an external memory unit.

[0021](3) The invention according to claim 3 releases said internal switch from said 2nd interface, when there is no command over said external memory unit in fixed time, and it turns OFF a power supply.

[0022]From the 2nd interface, if constituted in this way, when there is no demand to an external memory unit in fixed time, a power supply can be turned OFF and useless power consumption of an external memory unit can be held down.

[0023](4) When the state where said external memory unit is a removable media drive unit, and these media are not contained in an external memory unit carries out fixed time lapse of the invention according to claim 4, it releases said internal switch and turns OFF a power supply.

[0024]If constituted in this way, when the state where a removable media is not contained in an external memory unit continues fixed time, useless power consumption of an external memory unit can be held down by turning OFF a power supply.

[0025](5) a time check which the invention according to claim 5 figures out for time --- if a means is provided and it becomes at regular time, a power supply will be made one or will be turned OFF if constituted in this way, it can cooperate with a backup program of a personal computer, and automatic backup can be performed.

[0026](6) The invention according to claim 6 publishes a command which is in said 1st interface

at the time of a power turn when said Out switch is pushed, If a specific response returns from said external memory unit, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be directed via said 2nd interface. [0027] If constituted in this way, after a specific response returns from an external memory unit, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be set up from a personal computer, and OFF control of a power supply as occasion demands can be performed.

[0028] (7) At the time of a power turn, the invention according to claim 7 carries out the fixed time check of the thing without a command over said external memory unit from said 2nd interface, when said Out switch is pushed, If a command in said 1st interface is published and a specific response returns from an external memory unit when there is no fixed time, selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be directed via the 2nd interface.

[0029] If constituted in this way, when there will be no fixed time command in an external memory unit, After a specific response returns from an external memory unit, selection and time setting of whether a power supply is turned OFF or to turn OFF a power supply, immediately after an Out switch is pushed can be carried out from a personal computer, and OFF control of a power supply as occasion demands can be performed.

[0030] (8) From said 2nd interface, the invention according to claim 8 can direct selection of whether to turn OFF a power supply via the 2nd interface, when there is no demand to said external memory unit in fixed time.

[0031] Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when there is no demand to an external memory unit in fixed time if constituted in this way, OFF control of a power supply as occasion demands can be performed.

[0032] (9) Said external memory unit of the invention according to claim 9 is a removable media drive unit, When the state where these media are not contained in an external memory unit carries out fixed time lapse, selection of whether to turn OFF a power supply can be directed via said 2nd interface.

[0033] Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when are constituted in this way and the state where a removable media is not contained in an external memory unit carries out fixed time lapse, OFF control of a power supply as occasion demands can be performed.

[0034] (10) The invention according to claim 10 can direct setting out of regular time via said 2nd interface. If constituted in this way, setting out of regular time can be directed from a personal computer, and on-off control of a power supply as occasion demands can be performed.

[0035] (11) When said Out switch is pushed at the time of a power turn as for the invention according to claim 11, notify said control device to an external device through the 2nd interface, and it turns OFF a power supply with directions of this external device.

[0036] If constituted in this way, OFF control of a power supply can be performed from an external device.

[0037]

[— an embodiment of the invention — example] referring to drawings hereafter — an embodiment of the invention — an example is explained in detail. Drawing 1 is a block diagram showing an example of 1 embodiment of this invention. The same thing as drawing 12 attaches and shows the same numerals. It differs in that an example of an embodiment shown in a figure changed a point that the internal switch 35 was added to a lineblock diagram of drawing 12, and Out switch 22 to what is shown in Drawing 4 from what turns current on and off, and other components are the same as drawing 11. The external memory unit (for example, MO drive) 10 and the bridge system 20 are connected in the SCSI cable 25 and the power supply line 36.

[0038] The bridge system 20 is [from the power supply 4] on via the power supply jack 21. As for the power supply included in the bridge system 20, the power supply for operation of the bridge system 20 is created by the power supply 29 for bridges. On the other hand, the external memory unit 10 is [which was turned on from the power supply jack 21] on via the power supply line 36 via the internal switch 35.

[0039]The personal computer 1 is connected with USB controller 27 via the connector 23. This USB controller 27 is connected with SCSI controller 26 via the data bus 30. The control device 28 is connected with SCSI controller 26 and USB controller 27 via the data bus 30. From the control device 28, the on-off control signal 2g is outputted to the internal switch 35.

[0040]The electric power switch (Out switch) 22 gives the signal of low AKUCHIBU to the control device 28, as shown in drawing 4. That is, when Out switch 22 is pushed, the signal of the "L" level is given to the control device 28. 5 is LED controlled from the control device (henceforth CPU) 28. This LED5 displays power supply turning on and off.

[0041]The command sent through a USB cable from the personal computer 1, data, etc. are changed into the form which can be processed by CPU28 from a USB protocol with USB controller 27. This is changed and sent to the form that CPU28 can treat SCSI controller 26. SCSI controller 26 is changed into a SCSI protocol, and is sent to the external memory unit 10. The command and data transfer to the personal computer 1 from the external memory unit 10 follow the reverse. Thus, the inverter described by claim 1 shows USB controller 27, SCSI controller 26, and CPU28 here. It will be as follows if operation of the device constituted in this way is explained referring to the flow chart of drawing 2.

[0042]Drawing 2 is a flow chart which shows the 1st example of this invention of operation. If the power supply 4 is connected to the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13).

[0043]If Out switch 22 is pushed, CPU28 will make the internal switch 35 one, will supply a power supply to the external memory unit 10 (S14), and will turn on LED5 (S15). It can recognize that the power supply was turned on because this LED5 lights up.

[0044]Then, CPU28 performs bridge operation using USB controller 27 and SCSI controller 26, and makes the personal computer 1 and the external memory unit 10 communicate well (S16). If Out switch 22 is pushed when the internal switch 35 is one (S17), CPU28 will go into post-processing for power OFF (S18).

[0045]In post-processing, an operator is told about CPU28 having blinked LED5 and having gone into post-processing (S21). Then, the fixed time check of whether there is any data copy request from the personal computer 1 is carried out (S22). The data sent from the personal computer 1 is divided and sent to a small block. Therefore, it is necessary to confirm whether sending out of all the data of the personal computer 1 finished with Step S22.

[0046]When there are data transfer requests again from the personal computer 1, it returns to Step S16 and bridge operation is performed. When there are no data transfer requests, it is confirmed whether CPU28 left for 1 second, using a soft timer (S23). When there are no data transfer requests of 1 seconds or more, CPU28 publishes a command command specific next to the external memory unit 10 via SCSI controller 26 (S24).

[0047]When the external memory unit 10 has cash as the reason, It is because it tells that processing ended the external memory unit 10 via SCSI controller 26 to the bridge system 20 even if writing processing is not completed to nonvolatile memory (actual HD, MO, and the CD itself).

[0048]CPU28 which received this processing terminating notice needs to recognize that all the data that should be written in the cash (not shown) in the external memory unit 10 was assembled, and needs to detect that the writing to the storage was completed certainly next. Therefore, for example, CPU28 publishes a spin down (Spindown) command, when the 1st interface is SCSI (S24). Here, a spin down command is a signal for stopping rotation of MO, for example. CPU (not shown) in the external memory unit 10 returns GOOD KONDESHON to the bridge system 20, after the data writing to a storage is completed in response to a spin down command. Here, a command is not limited only to a spin down. Ejection may be sufficient as long as it is a removable media drive unit. However, finally media are discharged.

[0049]If GOOD KONDESHON returns from the external memory unit 10 (S25), CPU28 will turn OFF LED5 (S26) and will turn OFF the internal switch 35 (S27). In this state, the current supply to the external memory unit 10 is severed. Next, it returns to Step S13 and waits to push Out switch 22.

[0050] Since a power supply will be turned OFF if according to this example of an embodiment the specific response (here GOOD KONDESHON) to which it comes on the contrary is received from the external memory unit 10 when all the data is written in the external memory unit 10, A power supply can be turned OFF after writing certainly all the data which the personal computer 1 sends in the external memory unit 10.

[0051] Drawing 3 is a block diagram showing the 2nd example of an embodiment of this invention. The same thing as drawing 1 attaches and shows the same numerals. This example of an embodiment shows the circuit at the time of using an ATAPI interface as the external memory unit 10. In this case, the 1st interface controller as shown in drawing 1 becomes unnecessary. It is connected with the connector 23 via the interface part 33, and the interface controller 27 is connected with the personal computer 1.

[0052] Here, the thing for IEEE1394 is used as the interface controller 27. Since the communication wire for IEEE1394 contains the line for power supplies in an inside, when a power supply can be supplied from the personal computer 1, the power source wire is also connected with the connector 23. In this case, a power supply is connected to a power source line via the diode D2 for prevention of backflow. On the other hand, the power supply from the power supply 4 is also connected to the power source line via the diode D1 for prevention of backflow via the power supply jack 21. As a result, the power supply for operating the bridge system 20 can be supplied from the personal computer 1 and power supply 4 side, and the parallel run of a power supply becomes possible via the diode D1 for prevention of backflow, and D2.

[0053] The control device (CPU) 28 is connected with the interface controller 27 and the ATAPI interface 24 via the data bus 30. In the system constituted in this way, the case where the power supply 29 for bridges is supplied by the ON signal from Out switch 22 is considered. When the data writing demand to the external memory unit 10 from the personal computer 1 occurs, the data based on IEEE1394 from the personal computer 1, it can go into the interface controller 27 via the interface part 33, the control signal for an interface can be exchanged between CPU28, and the data of IEEE1394 conformity can be changed into the data of ATAPI. The data changed into ATAPI form is once stored in the cash of the external memory unit 10, and is written in a storage after that.

[0054] Here, cash's memory of all the data will output a processing end signal to it from the external memory unit 10 to the bridge system 20. CPU28 which received this processing end signal publishes a specific command (for example, Spindown) to the external memory unit 10. In the external memory unit 10 which received this command, when the data writing to a storage is completed, a data writing completion (GOOD KONDESHON) signal is outputted from internal CPU. If this GOOD KONDESHON signal is received, CPU28 will control the internal switch 35 and will release a point of contact. Thereby, the power supply currently supplied to the external memory unit 10 becomes **.

[0055] Since a power supply will be turned OFF if also in this example of an embodiment the specific response (here GOOD KONDESHON) to which it comes on the contrary is received from the external memory unit 10 when all the data is written in the external memory unit 10, A power supply can be turned OFF after writing certainly all the data which the personal computer 1 sends in the external memory unit 10.

[0056] According to the example of an embodiment mentioned above, it is effective in the ability to carry out without the above-mentioned power control needing change for the software of the existing external memory unit or a personal computer. Drawing 5 is a block diagram showing the 3rd example of an embodiment of this invention. The same thing as drawing 1 attaches and shows the same numerals. In the figure, 37 is the timer formed in the bridge system 20, and is connected with CPU28. This timer 37 clocks time and is backed up with the battery. Therefore, even if the power supply of a circuit becomes **, the timer 37 continues mincing time. Other composition is completely the same as the composition of drawing 1. Operation of this invention is explained using the system constituted in this way.

[0057] Drawing 6 is a flow chart which shows the 2nd example of this invention of operation. If the power supply 4 is connected with the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. CPU28 initializes the

bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13).

[0058]If Out switch 22 is pushed, it will supply a power supply to the external memory unit 10 (S14), and will turn on LED5 (S15). [CPU28] [the internal switch 35] Then, CPU28 performs bridge operation using SCSI controller 26 and USB controller 27, and makes the personal computer 1 and the external memory unit 10 communicate well (S16).

[0059]Next, after bridge operation is completed, CPU28 goes the time of the timer 37 to reading. On the other hand, CPU28 confirms whether Out switch 22 was pushed (S17a). When Out switch 22 is pushed, it goes into post-processing (S18). When Out switch 22 is not pushed, CPU28 counts time without access from the personal computer 1 using the timer 37 (S17b). That is, time when there is finally access is read and subsequent lapsed time will be counted. When there is access from the personal computer 1, CPU28 disregards the read time information.

[0060]When there is access from the personal computer 1, it returns to Step 16 and bridge operation is performed. When the state where there is no access from the personal computer 1 passes for 15 minutes, CPU28 goes into post-processing (S18). Post-processing is the completely same processing as post-processing shown in drawing 2. The connection from ** of a figure and ** also corresponds with the sequence of post-processing of drawing 2.

[0061]According to this example of an embodiment, from the 2nd interface, when there is no demand to an external memory unit in fixed time, a power supply can be turned OFF and the useless power consumption of an external memory unit can be held down.

[0062]Drawing 7 is a flow chart which shows the 3rd example of this invention of operation.

Drawing 5 is used as a system configuration. If the power supply 4 is connected with the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13).

[0063]If Out switch 22 is pushed, it will supply a power supply to the external memory unit 10 (S14), and will turn on LED5 (S15). [CPU28] [the internal switch 35] Then, CPU28 performs bridge operation using SCSI controller 26 and USB controller 27, and makes the personal computer 1 and the external memory unit 10 communicate well (S16).

[0064]Next, after bridge operation is completed, CPU28 confirms whether Out switch 22 was pushed (S17a). In this case, CPU28 memorizes the time which had the last access from the personal computer 1. When Out switch 22 is pushed, it goes into post-processing (S18). When Out switch 22 is not pushed, it is confirmed whether those without access from the personal computer 1 passed for 15 minutes (S17b). CPU28 goes to read the time information of the timer 37, and the passage of time for these 15 minutes is counted by deducting time with the last access from said personal computer 1.

[0065]When those without access from the personal computer 1 pass for 15 minutes, it goes into post-processing (S18). When those without access from the personal computer 1 do not pass for 15 minutes, CPU28 confirms whether those without a removable media (it abbreviates to media below) passed for 5 minutes (S17c). In this case, CPU28 will not go to read the timer 37, if media are inserted. And if media are drawn out, CPU28 will go to read the timer 37 and will memorize the time at that time. And if those without media pass for 5 minutes, it will go into post-processing (S18). The sequence of post-processing is completely the same as that of what was shown in drawing 2. The connection from ** of a figure and ** also corresponds with the sequence of post-processing of drawing 2.

[0066]According to this example of an embodiment, when the state where the removable media is not contained in the external memory unit 10 continues beyond in fixed time, the useless power consumption of the external memory unit 10 can be held down by turning OFF a power supply.

[0067]Drawing 8 is a flow chart which shows the 4th example of this invention of operation.

Drawing 5 is used as a system configuration. If the power supply 4 is connected with the bridge system 20 (S11), a power supply will be supplied from the power supply 29 for bridges, and CPU28 will start operation. In this case, the reserved period shall be beforehand memorized by CPU28. CPU28 initializes the bridge system 20 (S12). Then, CPU28 waits to push Out switch 22 (S13a). When Out switch 22 is pushed, it progresses to the processing after Step S14.

[0068]When Out switch 22 is not pushed, it waits to push Out switch 22. If it goes to read the timer 37 in the meantime and the time of the timer 37 becomes a reserved period, CPU28 will detect that and will make the internal switch 35 one (S13). As a result, a power supply comes to be supplied to the external memory unit 10. Simultaneously, LED5 is turned on (S15). Then, CPU28 performs bridge operation using SCSI controller 26 and USB controller 27, and makes the personal computer 1 and the external memory unit 10 communicate well (S16).

[0069]Next, after bridge operation is completed, CPU28 confirms whether Out switch 22 was pushed (S17a). In this case, CPU28 memorizes the time which had the last access from the personal computer 1. When Out switch 22 is pushed, it goes into post-processing (S18). When Out switch 22 is not pushed, it is confirmed whether those without access from the personal computer 1 passed for 15 minutes (S17b). CPU28 goes to read the time information of the timer 37, and the passage of time for these 15 minutes is counted by deducting time with the last access from said personal computer 1.

[0070]When those without access from the personal computer 1 pass for 15 minutes, it goes into post-processing (S18). When those without access from the personal computer 1 do not pass for 15 minutes, CPU28 confirms whether those without a removable media (it abbreviates to media below) passed for 5 minutes (S17c). In this case, CPU28 will not go to read the timer 37, if media are inserted. And if media are drawn out, CPU28 will go to read the timer 37 and will memorize the time at that time. And if those without media pass for 5 minutes, it will go into post-processing (S18). The sequence of post-processing is completely the same as that of what was shown in drawing 2. The connection from ** of a figure and ** also corresponds with the sequence of post-processing of drawing 2.

[0071]According to this example of an embodiment, it can cooperate with the backup program of the personal computer 1, and automatic backup can be performed. Drawing 9 is a flow chart which shows the 5th example of this invention of operation. It enables it to perform OFF control of the power supply of an external storage from an external device (for example, personal computer) in this example of an embodiment. The figure shows post-processing and is the same as that of what mentioned post-processing already. In an old invention, although the control device (CPU) 28 had published the command of the spin down, by this invention, it is made to publish the command of a spin down from the external device (for example, personal computer) side. The personal computer side also directs permission of power OFF. Drawing 1 is used as a system configuration.

[0072]If it goes into post-processing (S20), it will tell having blinked LED5 and having gone into post-processing (S21). If Out switch 22 is pushed, CPU28 will report that the switch was pushed on the personal computer 1 through the 2nd interface (USB interface) (S23).

[0073]It continues bridge operation until CPU28 has directions of power OFF from the personal computer 1 (S24, S25). The personal computer 1 will publish a spin down command to an external storage, if it finishes discharging all the data. If GOOD KONDESHON comes on the contrary from an external storage, it can recognize that all the data was written in nonvolatile memory, and power OFF will be directed to CPU28 of an external storage (S24, S25). CPU28 turns OFF LED5 in response to the directions from the personal computer 1 (S26), releases the internal switch 35, and turns OFF a power supply (S27).

[0074]According to this example of an embodiment, OFF control of a power supply can be performed from an external device (for example, personal computer). In this invention, utility software etc. are operated from a personal computer and it does not carry out whether the function of an invention mentioned above is used, or a user chooses or directions of setting out of waiting time can be performed.

[0075]For example, the command which is in said 1st interface (SCSI interface) at the time of a power turn when Out switch 22 is pushed is published, a power supply is turned OFF, immediately after turning OFF a power supply or pushing Out switch 22, if a specific response returns from said external memory unit 10 — a user can direct that selection via said 2nd interface — it can be made like.

[0076]If constituted in this way, after a specific response returns from the external memory unit 10, selection of whether a power supply is turned OFF or to turn OFF a power supply,

immediately after Out switch 22 is pushed can be set up from the personal computer 1, and OFF control of a power supply as occasion demands can be performed.

[0077]At the time of a power turn, when Out switch 22 is pushed, the fixed time check of the thing without the command over said external memory unit 10 is carried out from said 2nd interface (USB interface), The command which is in said 1st interface when there is no fixed time is published, When a specific response returns from the external memory unit 10, it can make it possible to direct selection of whether a power supply is turned OFF or to turn OFF a power supply, immediately after Out switch 22 is pushed via the 2nd interface.

[0078]If constituted in this way, when there will be no fixed time command in the external memory unit 10, After a specific response returns from the external memory unit 10, selection and time setting of whether a power supply is turned OFF or to turn OFF a power supply, immediately after Out switch 22 is pushed can be carried out from the personal computer 1, and OFF control of a power supply as occasion demands can be performed.

[0079]When there is no demand to said external memory unit 10 in fixed time, it can make it possible to direct selection of whether to turn OFF a power supply, and setting out of fixed time via the 2nd interface from the 2nd interface (USB interface).

[0080]Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when there is no demand to the external memory unit 10 in fixed time if constituted in this way, OFF control of a power supply as occasion demands can be performed.

[0081]The external memory unit 10 is a removable media, and when the state where these media are not contained in the external memory unit 10 carries out fixed time lapse, it can make it possible to direct selection of whether to turn OFF a power supply via said 2nd interface.

[0082]Since selection and time setting of whether to turn OFF a power supply can be performed from a personal computer when are constituted in this way and the state where the removable media is not contained in the external memory unit carries out fixed time lapse, OFF control of a power supply as occasion demands can be performed.

[0083]It can make it possible to direct setting out of the regular time via said 2nd interface. If constituted in this way, setting out of the regular time can be directed from a personal computer, and on-off control of a power supply as occasion demands can be performed.

[Translation done.]

* NOTICES *

JP0 and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the 1st example of an embodiment of this invention.

[Drawing 2] It is a flow chart which shows the 1st example of this invention of operation.

[Drawing 3] It is a block diagram showing the 2nd example of an embodiment of this invention.

[Drawing 4] It is a figure showing the example of composition of an Out switch.

[Drawing 5] It is a block diagram showing the 3rd example of an embodiment of this invention.

[Drawing 6] It is a flow chart which shows the 2nd example of this invention of operation.

[Drawing 7] It is a flow chart which shows the 3rd example of this invention of operation.

[Drawing 8] It is a flow chart which shows the 4th example of this invention of operation.

[Drawing 9] It is a flow chart which shows the 5th example of this invention of operation.

[Drawing 10] It is a figure showing a personal computer and an external storage.

[Drawing 11] It is a figure showing the example of appearance composition of USB or an external storage with an IEEE1394 interface.

[Drawing 12] It is a block diagram showing the example of the conventional composition of USB or an external storage with an IEEE1394 interface.

[Description of Notations]

1 Personal computer

4 Power supply

5 LED

10 External memory unit

20 Bridge system

21 Power supply jack

22 Out switch

23 Connector

24 SCSI interface

25 Cable

26 SCSI controller

27 USB controller

28 Control device (CPU)

29 The power supply for bridges

30 Data bus

31 and 32 Connector

35 Internal switch

36 Power supply line

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

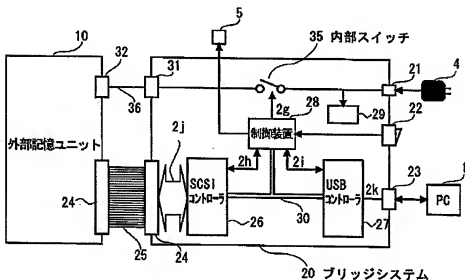
2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DRAWINGS

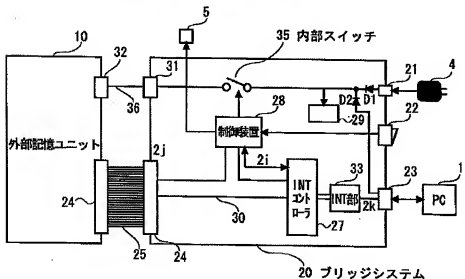
[Drawing 1]

本発明の第 1 の実施の形態例を示すブロック図



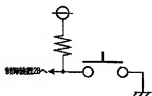
[Drawing 3]

本発明の第 2 の実施の形態例を示すブロック図



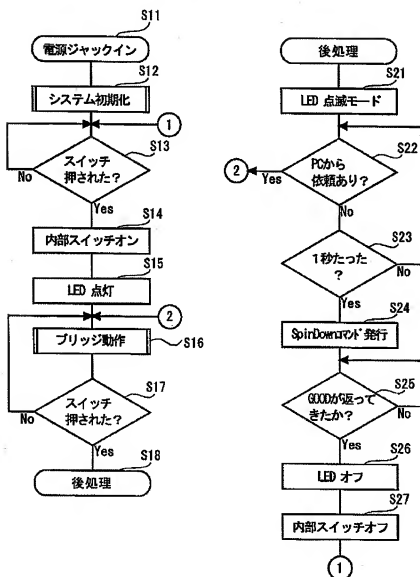
[Drawing 4]

外部スイッチの構成例を示す図



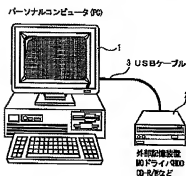
[Drawing 2]

本発明の第1の動作例を示すフローチャート



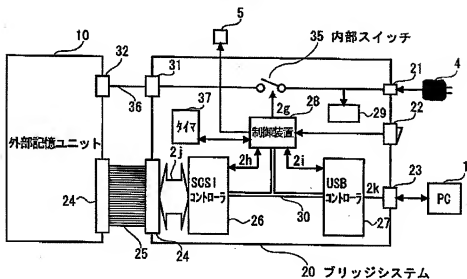
[Drawing 10]

パソコンと外部記憶装置を示す図

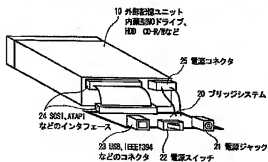


[Drawing 5]

本発明の第3の実施の形態例を示すブロック図

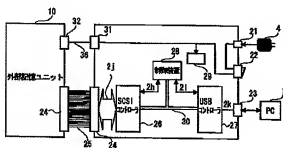


[Drawing 11]

USB又はIEEE1394インタフェース付外部記憶装置の
外観構成例を示す図

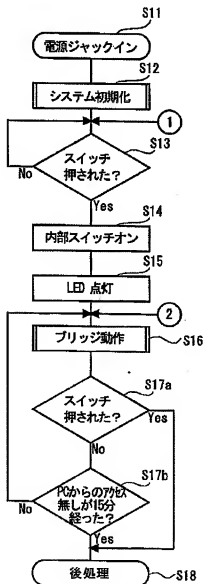
[Drawing 12]

USB又はIEEE1394インタフェース付外部記憶装置
の従来構成例を示すブロック図



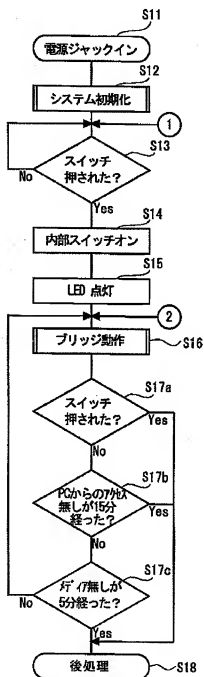
[Drawing 6]

本発明の第2の動作例を示すフローチャート



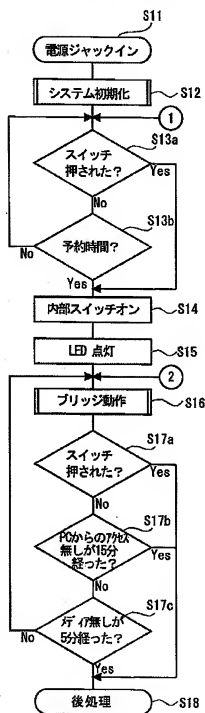
[Drawing 7]

本発明の第3の動作例を示すフローチャート



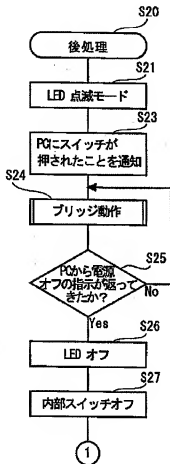
[Drawing 8]

本発明の第3の動作例を示すフローチャート



[Drawing 9]

本発明の第5の動作例を示すフローチャート



[Translation done.]